Chapter 2 Invalidating Relativity Theory

This chapter discusses the famous Relativity Theory (RT), and prove that both General Relativity Theory (GRT) and Special Relativity Theory (SRT) cannot be valid from four grounds: the intrinsic paradoxes arising in RT, the invalidation of experiments and observations, the logical errors in the formulation (process), and the invalidation of some basic assumptions.

2.1. Introduction of RT

Einstein published SRT in 1905, and after 10 years of continued working, he published GRT in 1915. SRT and GRT are collectively caller RT. In the over 100 years afterwards, RT became a dividing border between Classic Physics and Modern Physics and has been regarded the greatest breakthrough in human thinking.

RT is born with suspicions, and still faces a lot of objections even today. However, except a few high quality paradoxes ([D1-D8]), there are rarely any papers or books that formally disprove RT from the foundation. Due to the fact that mainstream physics academy has been suppressing anti-relativity publications for quite many years, a grass-root movement against RT is growing strong. However, the papers and alternative theories in this movement do not have the rigor and strength to defeat the obstinate quibbling of zealous supporters of RT: yes, RT is not perfect, but yours are even worse.

Here we must point out a false scientific view point: you have to use a better theory to replace a problematic theory. Indeed, academic progress is more or less like a knockout competition in a boxing ring, if you cannot beat the guy in the ring, he'll stay there forever as the winner. But sometimes, invalidating an old theory and finding a better new theory are not on the same pace. For example, someone may find errors in a claimed proof of Goldbach Conjecture, but he may not necessarily provide his own proof. This does not mean the false proof can still stand. A wrong theory should be discarded as soon as possible so that it will not misguide countless students and researchers of younger generations.

After lifelong pondering and on and off research over many years, the author has finally found the fatal errors of RT at the foundation level, and hence can invalidate the whole RT fundamentally. This chapter gives a rigorous, thorough disproof and points out the failures of the numerous existing supporting experimental and observational evidences of RT. The disproof also explains why RT "matched" so many prior data so well.

This chapter first discusses the basics of RT, and then invalidates it from four grounds:

1. The major conclusions of RT are self-contradicting, e.g., containing unresolvable paradoxes;
2. The experimental and observational evidences are invalid;
3. The main formula or deriving process have fatal flaws;
4. Some basic assumptions in RT (including constancy of light speed) are invalid.

In fact, any of the four grounds is sufficient to disproof RT. Because RT has been widely accepted in the society and SRT has now even been released to high schools, if we don't shake the foundation of RT from multiple grounds, nobody will take anti-relativity researches seriously. The mainstream physics academy has kept suppressing such researches and doubts for quite a while.

2.1.1. The basics and deriving process of SRT

To discover the errors in RT, let's take a close look at the derivation process of SRT and its main conclusions. **SRT is based on the following Basic Assumptions** ([C3-C6][D1] [D9])**:**

1. Physical Laws are invariant (i.e., identical) in all inertia reference frames (with no acceleration).
2. Light speed c in the vacuum is the same to all observers with constant motion, irrelevant to the speed of the light source and observer.

Under these two assumptions, Einstein applied the assumption of constant light speed to Lorentz Transform (LT), and obtained the basic formulas and conclusions of SRT. The so-called LT, in the general sense, is the coordinate transform formulas of time and position between two inertia reference frames.

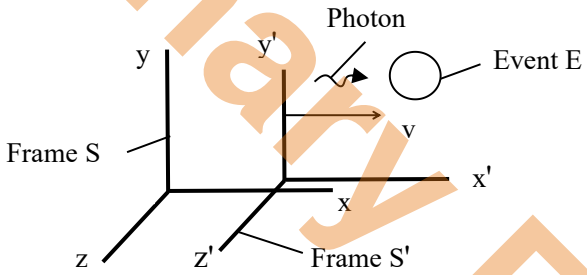

Fig. 2.1. Coordinate Systems of Two Inertia Reference Frames

Assume S and S' are two inertia references with their origins overlapped (i.e., a common event defines x=0、t=0 and x'=0、t'=0)，and S' moves to the right of S along x direction linearly with speed v, as shown in Fig. 2.1. Assume an event E has a coordinate (x,t) in S, and its corresponding coordinate in S' is (x', t')，then the Gallileo Transform (in Newton Mechanics) is:

$$x' = x - vt, \quad t' = t \tag{2-1}$$

The equation above is consistent with our daily experiences. In classic physics, time is an independent dimension and does not change with reference frame, and the times in the two reference frames are all identical. After time t, S' has moved a distance of vt, therefore x'=x−vt. Now, we take derivatives on both sides of the above equation, so to obtain the following velocity relation:

$$u' = u - v, \quad u = u' + v \tag{2-2}$$

in which, u' = dx'/dt' and u = dx/dt are the velocities of event E in reference frame S' and S respectively.

Now we assume u' and u are all constant, and hence

$$x' = u' t', \quad x = ut \tag{2-3}$$

Lorentz Transform (LT)

Eq. (2-1) is the Newtonian relation of two coordinates (x', t') and (x, t) in two reference frames, while for LT, the two reference frames S and S' each uses its own time to measure the same event E, such that not only each frame gets a different coordinate, but also a different time (at least this is the general assumption in the beginning). LT tries to find a direct representation between (x', t') and (x, t).

In general, (x', t') and (x, t) may have a non-linear relation. In the original derivation of LT and early SRT literature, a linear relation has been assumed. Later, to prove that linear transform is the only legitimate transform, Length Conservation principle in Minkowski Space is introduced to show that LT has to be linear. The linearity requirement can also be obtained from the Structure Invariance Principle (SIP) that is to be discussed later in this Chapter. Professionals can find many detailed derivations of LT in SRT on the web, or prove it themselves from the SIP discussed later: **any LT satisfying SIP must be a linear transform, and any (positive) linear transform satisfies SIP.**

So，for readability purpose, this section uses the classic deriving process of linear LT.

A general linear representation between coordinate (x', t') and (x, t) can be expressed as

$$x' = Ax + Bt, \qquad t' = Cx + Dt \tag{2-4}$$

In which, A, B, C, D are all constants (which may be functions of speed v). Now we consider 5 special cases:

1. First, the origin of S' moves with speed v, so the line x' = 0 in S' corresponds to the line x=vt in S.

2. Now consider the event of $(x, t_1) = (v,1)$ on x=vt in S, which corresponds to the event （x' ,t') = $(0,t'_1)$ in S' (see Eq. (2-1)). By the principles of SRT, here we cannot assume $t'_1 = t_1 = 1$. So, by Eq. (2-4), we have $0 = Av + B\cdot 1$, so we get

$$B = -Av \tag{2-5}$$

so from Eqs. (2-4）and (2-5),

$$x' = A(x - vt) \tag{2-6}$$

3. On the other hand, S' sees the origin of S moves with a constant speed of -v, so the line x' = -vt' in S' corresponds line x=0 in S. That is, an event $(x' ,t'_2) = (-v, t'_2)$ in S' corresponds to event $(x, t) = (0, t_2)$ in S. Again, here we don't know what value t_2 is, that is, we cannot assume $t_2 = t'_2$.

Put x' = -vt' and x = 0 into Eqs. (2-6) and (2-4), we get

$$-vt' = A(0-vt), \quad t' = C\cdot 0 + Dt \tag{2-7}$$

From Eq (2-7) we obtain

$$D = A \tag{2-8}$$

And Eq. (2-4) becomes

$$x' = A(x-vt), \quad t' = Cx + At \tag{2-9}$$

4. Now we obtain A and C by using the assumption of constant light speed. Consider a photon emitted from the origin of S' (to the right), its coordinate at any time in S' can be represented by x' = ct'. Now, for the point (x', t') = (c·1,1) in S', its coordinate in S satisfies x=ct, i.e., (x, t) = (ct, t). Replacing x' = c ·1 and x = ct into（2-9 and (2-4) leads to

$$c\cdot 1 = A(ct-vt), \quad 1 = Cct+At \tag{2-10}$$

From which

$$C = -A\,v/c^2 \tag{2-11}$$

Now Eq. (2-9) becomes

$$x' = A(x-vt), \quad t' = A(t - x\,v/c^2) \tag{2-12}$$

5. Finally we solve A using the Reciprocity Principle. From Eq.（2-12） we can get the inverse transform of (x', t') to (x, t) as follows:

$$x = \frac{x'+vt'}{A_v(1-v^2/c^2)}, \qquad t = \frac{t'+(v/c^2)x'}{A_v(1-v^2/c^2)} \tag{2-13}$$

In the above equations, we replaced A by A_v, so to draw a difference with A_{-v} in the reciprocal representation below.

Note that the only difference between seeing S by S' and seeing S' by S is, the velocity of S' relative S is v, while the velocity of S relative to S' is -v (because x and x' all points to the right direction). Thus, if we change the roles in the process of deriving Eq. (2-4) to Eq. (2-12) (and change speed v to -v at the same time), we should get the following from Eq. (2-12):

$$x = A_{-v}(x' + vt'), \quad t = A_{-v}(t' + x'\,v/c^2) \tag{2-14}$$

Comparing Eqs.（2-13） and (2-14), we get

$$A_v A_{-v} = 1/(1-v^2/c^2) \tag{2-15}$$

Due to space symmetry and reciprocity of reference frames S and S', we must have $A_v = A_{-v} = A$. As such, Eq. (2-15) produces

$$A \equiv \gamma = 1/\sqrt{1 - v^2/c^2} \tag{2-16}$$

where "≡" means "is defined as". Now by Eq. (2-16) and (2-12), we get the final LT in SRT as

$$x' = \gamma\,(x - vt), \quad t' = \gamma\,(t - x\,v/c^2) \tag{2-17}$$

With the deriving process above, SRT concludes the following from Lorentz Transform ([C1]-[C6]):

I. **Time Dillation**: Two observers A and B with relative speed v, each sees that the other party has a slower clock, that is, its own clock is γ times faster，where $\gamma = 1/\sqrt{1 - v^2/c^2}$. More precisely, if tA and tB are the times read from the clocks owned by A and B respectively, t'A and t'B are the times of tA and tB converted to the coordinate systems of B and A respectively, then

$$t_A = \gamma\,t'_B \ , \qquad t_B = \gamma\,t'_A \ 。 \tag{2-18}$$

II. **Space Contraction**: along the direction of the relative speed v, the two observers A and B all feel that the other party's length has contracted by a factor of γ. Assume A and B each has a bar of the same length (at still) along the v direction, and l_A and l_B are the lengths measured by themselves, and l'_A and l'_B are the values of l_A and l_B converted to the coordinate system of the other party (i.e., B or A respectively), then we must have

$$l'_B = l_A/\gamma \ , \qquad l'_A = l_B/\gamma \tag{2-19}$$

Please note here, **the time difference (t_A - t'_B) = (γ-1) t'_B or length difference of (l_A - l'_B) = (γ-1) l'_B of two reference frames A and B is accumulating when the measured time or length increases.**

The above derivation has been examined and studied by countless scholars and students, and not a single error has been discovered. So now, all a sudden someone stands up and say there is something wrong with it, the first reaction of those who have gone through the process must be that he is either too dumb or insane.

In later part of this chapter, we shall rigorously prove that, **not only light speed is not constant, but there are at least two big, but very well hidden logic errors in the deriving process of Lorentz Transform.** It is unforgivable that for over a hundred years, so many great minds did not find these big loigic errors.

2.1.2. Basics of General Relativity Theory (GRT)

GRT is a very big subject, and involves complicated Tensor Mathematics, Riemannian Geometry, Clifford Algebra etc. advanced mathematics. Therefore, in this section we are not going into detailed discussion, but only introduce its main thought and the Einstein Gravity Equation and Einstein Cosmos Equation (or Einstein Field Equation). Because the basis of GRT is SRT, if SRT is invalid, GRT loses its living root automatically.

So, ordinary readers can skip the discussion of GRT, and pay attention to the disproof of SRT only. The reason we spend length here to disprove GRT in a formal way is to meet the challenges from physics professionals. Not only the foundation of GRT, the SRT, is collapsed, GRT per se also has obvious flaws and philosophic deficiencies. Only a direct, indisputable disproof of GRT can quickly convince its supporters and believers to the heart.

The Main Philoshophical Thoughts of GRT

The main Philosophical Thoughts as as follows.

First, GRT thinks that time is not independent of space, rather, through the form of $i$ct + **X,** time and space form an integrated spacetime, called Minkowski spacetime, where i is the unit imaginary number, c light speed, t time, and **X** 3D space coordinate (a vector). **X** is often represented by (x,y,z) or (x_1,x_2,x_3). Such a 4D spacetime in a complex number form can hardly do any length transform, because time and space cannot directly convert to each other.

Then, in GRT, where one measures the length in spacetime with the square of the modulus of $i$ct + **X**, called metric. For example, for the length of differential segment **ds** = $icdt + dx + dy + dz$, then the metric of ds is often expressed

$$\boldsymbol{ds}^2 = \mathbf{ds} \cdot \mathbf{ds} = -c^2dt^2 + dx^2 + dy^2 + dz^2 \qquad (2\text{-}20)$$

wherein light speed c is often treated as 1 (by changing the unit). $\boldsymbol{ds}^2$ is called a (Minkowski) spacetime metric. Magically, by multiplying time with light speed c, through Eq. (2-19), time and space and convert to each other (at least mathematically).

So afterwards, any metric in Minkowski spacetime has a form similar to Eq. (2-20) (always squared). By convention, spacetime always mean Minkowski spacetime.

Particle Energy Equation and Einstein Energy Equation

Similarly, in spacetime, energy and momentum can be combined to form a 4-dimensional

vector

$$\mathbf{p} = (E, p_x, p_y, p_z) \tag{2-21}$$

Where (p_x, p_y, p_z) is the three component of the momentum, E is the energy. From SRT, the momentum and speed of a particle is related by

$$p = \gamma m v = m v / \sqrt{1 - v^2 / c^2} \tag{2-22}$$

from which one can obtain

$$v = pc / \sqrt{m^2 c^2 + p^2} \tag{2-23}$$

Consider that the relation of work and kinetic energy in a particle motion is

$$\Delta K = \int v dp = \int pc dp / \sqrt{m^2 c^2 + p^2} \tag{2-24}$$

Now take the integral from still (p=0), and treat all the work done to the particle as its energy increase, then the Particle Energy Equation in spacetime is given by

$$E^2 = m^2 c^4 + p^2 c^2 \tag{2-25}$$

For photons, its momentum is considered 0 in SRT. Therefore, Eq. (2-25) degenerates to the famous Einstein Mass-Energy Equation:

$$E = m c^2 \tag{2-26}$$

Here, let's note an interesting phenomenon: in spacetime, in general an invariance relation is always based on a squared metric. For example, Eqs. (2-20) and (2-25) are all intrinsically squared relations. Does God favor squared relation over linear one?

Einstein Gravity Equation (EGE)

Through tensorizing mass and using the expressions of Riemannian Geometry, Einstein thinks that in a relatively static universe, all materials obey the following Einstein Gravity Equation (EGE) in spacetime

$$R_{ab} - \frac{1}{2} R g_{ab} = \kappa T_{ab} \tag{2-27}$$

in which R_{ab} is a Ricci tensor, g_{ab} a partial derivative (of gravity field), T_{ab} Pressure-Energy tensor (alsoe called mass energy-momentum tensor), $\kappa = 8\pi G/c^4$ a constant, G the (Newtonian) gravity constant, and c the light speed, while

$$R = R_{cd} g^{cd} \tag{2-28}$$

is a spacetime curvature Ricci scaler.

Einstein Cosmos Equation (ECE)

For a dynamic cosmos, for example, the ever-expanding universe regarded by mainstream cosmologists, Einstein think that by adding an item containing a cosmos constant Λ, then the cosmos is governed by the following Einstein Cosmos (or Field) Equation (ECE):

$$R_{ab} - \frac{1}{2} R g_{ab} + \Lambda g_{ab} = \kappa T_{ab} \tag{2-29}$$

For convenience, the Newtonian Gravity Field Equation is also listed below:

$$\nabla^2 \Phi = \left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2}\right) \Phi = 4\pi G \rho \tag{2-30}$$

wherein Φ is the potential energy of the gravity field and ρ the mass density of the gravity renderer (Attractor).

In essence, EGE and ECE try to obtain a universal law that governs both massless photons and massive materials in spacetime in a unified form.

Note that in the EGE (2-27) and ECE (2-29), ab and cd represent the indexes of partial derivatives, so that Eq. (2-27) and (2-29) are all a 4x4 matrix equation, while Newtonian Gravity Field Equation (2-30) is only a single scaler equation. As such, intrinsically, GRT contains many more parameters, therefore can adapt to different practical situations much better. Later on we shall show, it is this wider adaptivity that GRT is supported by numerous experimental and observational data. But, such a match (due to having a big number of parameters) does not mean that GRT reflects the reality in the physical world.

The fundamental principle belying the EGE and ECE is, Einstein thinks, the least change of particle energy in spacetime is the fundamental motion law in spacetime. This law, in many cases, can be represented by the (energy) geodesics of twisted spacetime by gravity. All particles should move along the geodesics.

This principle looks like alright, but in reality has many problems, especially in the EGE and ECE originated from it. The Principle has two flaws: **first, time and space are independent and do not form an integrated spacetime; second, the energy of a particle (in spacetime) is not determined by the gravity field alone, but is also related to the velocity vector and spin of the particle with respect to the gravity mass.** These will be addressed in later sections and chapters.

2.1.3. Philosophical Implications of RT and its Impact on Human Thinking

RT not only is in the bones of modern physics, shaping the foundation of Quantum Mechanics, Quantum Field Theory, Particle Physics, Astrophysics and Cosmology, but also diffused into social sciences and philosophies, greatly impacting the world view, political science, and sociology of human society.

From a scientific point of view, the verification of the amazing predictions of RT has been regarded as undoubtably correct evidences of precise experimental and observational proofs, so that, its mathematical methodology is abused in the whole scientific academy (especially in theoretic fields). As a consequence, the foundation of the 100+ years modern physics afterwards is built on a shaky ground. Not only it wasted a lot of time and resources in establishing a whole set of pseudo sciences and leading both the micro and macro sciences into wrong directions, but also it fostered an unhealthy research style of playing fancy mathematics. Mathematics should only be an auxiliary means of computing and describing physical phenomena, but never become a leading method in physics study.

From a philosophical point of view, RT denies the absoluteness of scientific and natural laws, therefore it obviously also denies a common standard in measuring scientific and

objective reality, so that it provides scientific support to those who denies mankind's universal values. Some thought factions calling for absolute freedom set RT as their scientific foundation and regard it as the will of God.

From a sociological point of view, the opposing leftists, authoritarians, and absolute freedomists all label themselves as the avant-gardes of ideology, apply the sophistic arguments of (Hegel's) dialectics to social practices, and confuse people's minds, so that majority of the people get confused about right and wrong, insist on own views, leading to great division of the society. Once truth loses absoluteness, mankind may return back to the primitive jungle society where winner is the king, bringing great retrogression and disaster to human civilization.

Hence negating RT radically is not only a scientific correction, but also a long term cleaning process of human thinking and ideology.

2.2. Invalidation of GRT

Theoretically, GRT is built on the foundation of SRT. To invalidate the whole RT, it suffices to invalidate only SRT. And if SRT is invalidated, GRT collapses automatically, then why bother on disproving GRT? In author's small circle of private disclosing anti-relativity papers, many physics professionals, taking advantage of their authority in GRT as well as the abstruseness and hard-to-refute nature of GRT, negligently discard all the challenges to RT. Even if the challenges are on SRT, many still deny the challenges using the theory and data from GRT. Therefore, in this section, we hit GRT first, and show that even the smartest group of people can also lose sight collectively.

As said earlier, the invalidation of GRT is carried out on four grounds.

2.2.1. GRT Not Self-Consistent Logically

To have professional GRT experts to seriously treat challenges to GRT, we have to find some serious errors in it, or these humen with highest IQs will all scorn off the challenges. Convincing smart people is as difficult as convincing dumb guys, sometime even harder. Then, what is the logical reasons that GRT is invalid?

That is the time of reference frame. According to SRT, time is relative, not absolute, and is therefore different in different reference frames. Now consider the two situations in Fig. 2.2.

In Fig. 2.2 (I), gravity mass A and B all move away from particle m, and the velocities of A and B with respect to m are v_A=-v and v_B=v respectively. Now if t is the time on m, and t^A and t^B are the times on A and B respectively, then according to Eq. (2-17), we have

$$t^A = \gamma\,(t + x\,v/c^2)\ ,\quad t^B = \gamma\,(t - x\,v/c^2) \tag{2-31}$$

Although γ is the same in the above equations, because the A and B have opposite velocity directions, to particle m, the time t^A and t^B on gravity masses A and B are completely different. Then, in EGE and ECE, which time should particle m use? In the cosmos Big Bang model, if

two stars A and B are on a diameter at the two sides of the explosion center, then the motion direction of these two stars are opposite, as shown in Fig. 2.2 (I).

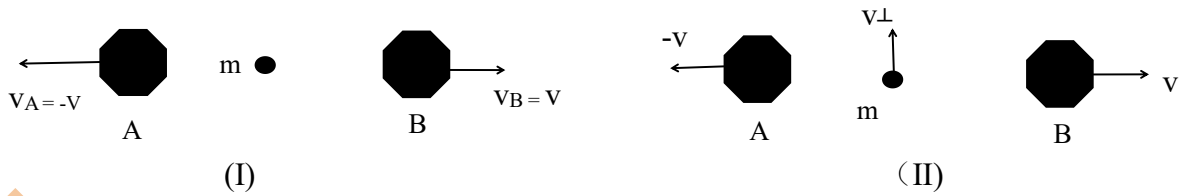

Fig. 2.2 Complicated Gravity Fields

If particle m is also in motion, then because EGE and ECE do not contain any information about it, the motion information of particle m cannot be reflected in the EGE and ECE, therefore there is no way to determine the time to be used in the EGE and ECE. For example, if in Fig. 2.2 (II), particle m moves in a direction vertical to the space in between gravity masses A and B, then the velocity situation gets even more complicated. The star configurations in a galaxy are even more complicated than the situation in Fig. 2.2 (II). Numerous stars have numerous velocities. According to SRT, the time in each of these stars is different for the particle to be measured. Then, which time is to be used in the EGE and ECE? Will they all use local time? If EGE and ECE always use local time, how can they applied to interstar situations?

Maybe someone would say, the time t on particle m can be used. But sorry, the EGE and ECE do not contain any information about particles, but only information about gravity field/mass (i.e., the mass that provides gravity).

Of course, the supporters of RT can say, in practice, we need only to consider local gravity field, so only one time needs to be considered. But even in such a situation, this local time is related to the velocity of the particle that is to be observed. For example, in the Solar System, there are multiple planets in motion, there is no way to use a single time (e.g., Earth and Mars can hardly use the same time) in the EGE/ECE. Such an equation, because of its complexity, has no practical use, not to mention its correctness.

2.2.2. Experimental and Observational Support of GRT Invalid

Then, how to explain, to this date, GRT has “passed” almost all macro tests? This question can also be asked in another way: for GRT such a problematic theory, why in the past nobody finds inconsistencies in so many tests? What can be said about this? Well, this question will be answered when we disprove SRT in a later section.

Here, we’ll examine some major experimental and observational tests that “support” GRT, and invalidate all of them.

Gravity Time Dillation and Gravity Redshift

SRT predicts time dillation, while GRT predicts gravity redshift. That means, when photon flies to gravity center along gravity line (in 3D space), its wavelength will have blue shift, and

when it flies away from the gravity center along gravity line (in 3D space), its frequency will have redshift. Many researches consider that gravity redshift has been found in laboratories (e.g., [E26][C40]) and measured and verified in astronomical observations ([E27-29]).

However, we must point out, the researches in the lab. (e.g., [E26][C40]) discovered only the existence of redshift, but cannot clearly attribute it to gravity. Because, the gravity field of Earth is too weak, not strong enough to prove the accuracy and correctness of GRT formula. In fact, the author has examined many papers serving as leading evidence supports, and none of them establishes a relevant connection between the observations and GRT.

Now let's examine the supports of GRT from astronomical observations. Earlier observations also discovered only the existence of redshift phenomena ([E27][E28]), but cannot establish a direct, accurate connection between GRT and redshift. Many of these tests, are actually "making" the data to match theory. For example, reference [E30] points out, in 1924, the famous astrophysicist Arthur Eddington requested Astronomer S. Adams to help him to verify the Einstein (gravity) redshift on white dwarf Serius B. According to his calculation, this redshift is about 28.5km s^{-1}. The second year, Adams published his observational result: ： 23 km s^{-1}. It looks like a not too bad match. But unfortunately, follow-on researchers discovered these theoretical and observational data all have a 4x error. Isn't it miraculous? If the calculation has a 4x error, then it might be some math error, how can the observation also have a same 4x error?

The latest theoretical prediction of the redshift of Serius B is 89 km s^{-1}, and the latest observational values are 83km s^{-1}, 80.42km s^{-1}, and 80.65km s^{-1} respectively ([E28]). But, in the computational process, many corrections and normalization are performed. The fallacy of these redshift proofs is exposed by the following question: **at the moment photon leaves Serius B, won't it first have a big blueshift by the massive gravity field? Then, shouldn't the redshift caused when it leaves Serius B first conpensate the blushift and then restore the original wavelength？**

Later we shall question the physical mechanism of gravity redshift, and show that cosmological redshift can have multiple causes, gravity redshift is only one and the weakest of them. It is not rigorous to draw conclusions before all of these causes are clearly understood.

Time Delay and Light Deflection caused by Gravity

There are tests about time delay effects of gravity in the gravity of of Earth using atomic clocks ([E31-E32][C40]). But these early tests are about the time dillation of SRT, not about gravity time delay. These tests , including the GPS tests ([E32]), are actually related to the Doppler effect of light wavelength (frequency), while the satellites not only move much faster than Earth, their working environments are also different. As such, the redshift of light attributed to Doppler effect can actually be caused by other causes, including the fast motion of satellites, the temperature difference (of satellite with Lab), frequency variation of atomic clock in zero weight situation, and the temperature redshift of photon due to temperature change.

Better supports for GRT comes from observations of star light deflection ([C42]), which are also regarded as almost perfect evidences ([E32]). But some scholars disagree and say it is

not sure which one these observations support better, GRT or alternative theories that produce similar predictions ([C40]).

Because light deflection tests are the most accurate ones, which also made GRT famous, let's spend more time to discuss them below. One of the tests is the perihelion precession of Mercury. This test also has undergone several model corrections before it has more accurate data so to well match the prediction of GRT. Using the stable radio signals from pulse stars, astronomers can measures the light defection near Sun to within 0.3% accuracy with theoretic prediction. However, when the same method is applied to Jupiter, accuracy is only 50% ([C42]).

The star light deflection tests, which have been regarded as almost perfect matches by astrophysicists, are now formally negated below, by exposing the serious flaws of existing methods through an examplar figure in reference [C42].

Fig. 2.3 is an example that is often used by astrophysicists to calculate star light deflection. In this figure, all light were represented by straight lines or polylines. But according to GRT, the motion trajectory of photon near a gravity field should be a curve, as shown in Fig. 2.4. Therefore, the accuracy of using lines or polylines to calculate the deviation angles of photon motion depends on many parameters. As such, the so called accurate measurements deserve great suspicion.

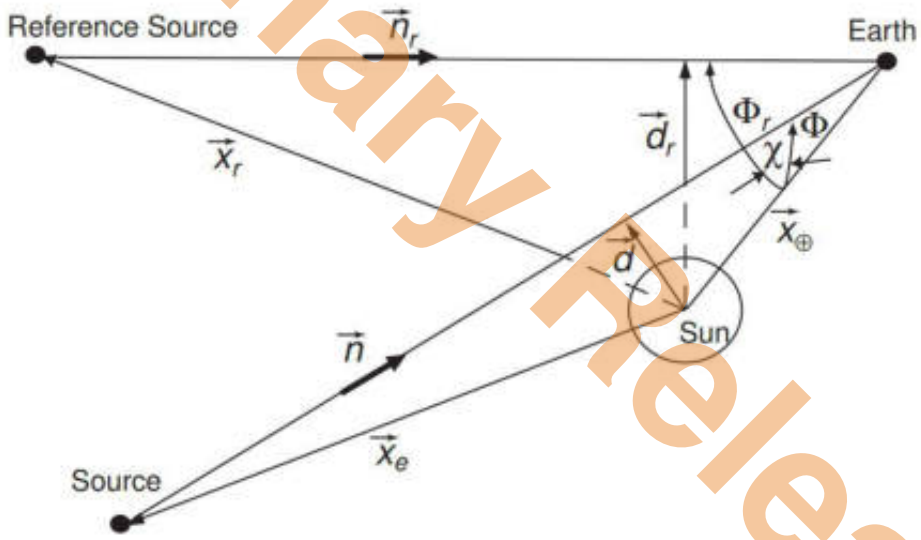

Fig. 2.3. Star Light Deflection

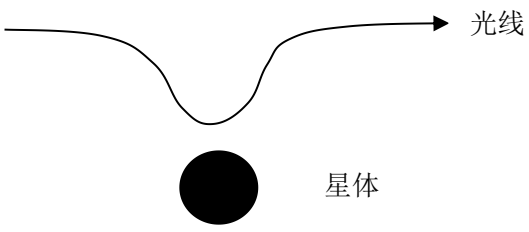

Fig. 2.4. Geodesic or Motion Trajectory of Photon in GRT

Fig. 2.4 can also be used to challenge the physical mechanism of gravity redshift mentioned earlier. Here we have several questions: (1) Is redshift permanent, or will it automatically disappear when gravity is gone? (2) Does gravity redshift accumulate or depend only on the strength of local gravity field? If it accumulates, how does the gravity field perform work on photon (which is massless as regarded by SRT)? (3) Is redshift related to the angle between gravity field and the velocity of photon? Where does GRT reflect this angle relation?

These three questions are very important, and we now discuss them in more detail.

On the first question, according to my understanding of GRT, (GRT thinks) redshift cannot be permanent, and will disappear when gravity is gone. For example, when photon enters glass from air, its wavelength has blueshift, and when it exits glass into air again, it will have redshift, canceling the previous blueshift and restoring the old wavelength. Gravity redshift, if it exists, should have similar physical mechanism. Therefore, the redshift we measure on Earth, has little to do with stars far away, but somewhat to do with Earth gravity (plus some Sun gravity).

On the second question, my understanding is, redshift does accumulate, but GRT thinks, it is caused by the bending of spacetime, and if it is gone, so will redshift. Therefore, according to GRT, in Fig. 2.4, when photon enters gravtiy field, its wavelength will have redshift, and when it leaves, redshift will be gone. The symmetry of photon's entering and leaving paths, can lead to difference in redshift accumulation. On the other hand, according to the discussion a bit later, all forces on a particle are balanced, the total resulting force (including the Newtonian reactionary force) are balanced, so that the total force is zero. With zero force on every particle everywhere, there is no spacetime bending at all.

On the third question, when photon changes its frequency, won't the change amount depend on the angle between its velocity and the gravity field? Both the EGE ad ECG cannot answer this question, because they contain absolutely no information about the direction of photon velocity. Later, we shall prove, if SRT holds, then photon's frequency change (gravity redshift) in a gravity field indeed depends on the angle between its velocity and gravity field.

On star light deflection, a deflection effect long ignored is **Star Cloud Deflection,** which is due to the light refraction effect of non-uniform cloud density near a star. We know that the density of a gas will affect the refraction rate of light. The cloud surrounding a star consists of materials like gas or plasma, whose refraction rate changes with its density. The density of star cloud decreases with the distance to the center of gravity, so that it has a lens effect. **This Star Cloud Deflection well explains the "gravity lens" effect.**

Gravity Wave and Graviton

Strictly speaking, gravity wave is not a patent of GRT. Due to the weakness of gravity, except some observations of black hole collision, many tests of gravity wave did not bring any new meaningful discovery and graviton is nowhere found. Because GRT per se cannot hold, the theories of gravity wave and graviton based on GRT are then groundless. In a later chapter we shall see, graviton is actually not an extra particle. As a matter of fact, inability to find dark matter and graviton is only one of the failures of GRT, and the greatest failure is that it is wrong at the foundation.

Orbit Effect

For planets in obital motion, GRT is also considered to be more powerful than Newtonian gravity theory. For example, GRT predicts that a planet in orbital revolution will have precession ([C44]), and orbit degression itself can be due to gravity radiation ([C44][E33]). However, on precession, post-Newtonian mechanics can also approximate such effects ([C45]). As for orbit degression, the radiation caused by gravity, compared to black body radiation of stars, can be ignored almost completely, and the radiation degression caused by gravity is drowned in the radiation reduction caused by temperature reduction of stars. Therefore, any measurements of such has not practical meaning. In fact, for objects in slow motion, GRT degenerates to Newtonian gravity theory. Under such circumstances, it is not surprising at all that GRT produces correct results.

Geodetic Effect and Frame Dragging

A great weakness in the whole GRT is it is super difficult and troublesome in handling acceleration and rotation, and in such cases, it often uses localization method, which not only introduces a lot of parameters but relies heavily on empirical data. GRT obtained some degree of success in Geodetic Effect and Frame Dragging ([E35])，though there is dispute on the latter. Still, these cannot add any scores to GRT. Why? Because as said above, for planets with a speed far less than light, any gravity theory degenerates to Newtonian, which obtains the same results with simpler math while need only to include the planet spin into consideration.

Summary of Evidence Supports of GRT

Here let's summarize why the apparently precise predictions and matches in so many tests do not lend to solid support to the correctness and advantage of GRT. Newtonian gravity field equation (2-30) is only a single scaler partial differentiation equation, while EGE in Eq. (2-27) and ECE in Eq. (2-29) are 4x4 matrix equations, each involving nearly 20 more parameters. When the object speed in a gravity field is very low, GRT degenerates to Newtonian gravity theory, but yet, it still has so many more parameters to adapt to particular situations.

In addition, whenever it involves complicated non-linear computation, such as rotation, acceleration, disturbing, GRT has to resort to localization method, or introduce new Largrangians, bringing additional parameters.

Therefore, all the existing tests basically cannot be used as the evidences to support GRT. Even for those apparently accurate observations, they are good simply because GRT has many more parameters, and when the motion of the object is slow, improved Newtonian mechanics is sufficient, and yet simpler and more clear.

The concepts of **Temperature Redshit, Star Cloud Redshift, and Star Cloud Refraction** introduced in this book for the first time, can explain the cosmological redshift and light deflection much better. Temperature Redshift means, if photon has temperature, then, when its temperature cools down, its frequency will be reduced, hence produces the (frequency) redshift, while Star Cloud Redshift means when photon leaves Star Cloud from a dense area to a less dense area, its wavelength (but not its frequency) will be increased, and hence produces

the (wavelength) redshift.

We must emphasize here, the reason we can discard all experimental and observational evidences of GRT in a single stroke, is because our disproof of GRT is at its foundation. **If GRT is wrong at the foundation, then any supporting evidence can at best be a coincidence.**

2.2.3. Applications of GRT

Although GRT has so many issues, because it remains the mainstay theory of astrophysics and cosmology, it is still used in many areas. These are all very professional domains beyond the scope of this book. We discuss here the problems it faces in three applications.

Gravity Lens

The amazing prediction that Light will bend in gravity field is made by Einstein and its verification established the statue of GRT. But, bending of light is not a patent of GRT. The Star Cloud Refraction theory mentioned above can also lead to the same conclusion.

First, light in air will also undergo refraction, and the refraction rate increases as the density of air increases. Stars are surrounded by a lot of star clouds, and the density of a star cloud changes with the distance to the center of gravity of the star. In a distance closer to the gravity center, the density of the cloud is higher and so is the refraction rate. When looking at the absolute value of the refraction rate of star cloud, it may be very close to 1. But, the because the gravitation radius of a star can be very large, and light can go through a very long distance in the star cloud, such that photon's total deflection angle crossing a star cloud cannot be neglected. That is, **Star Cloud Refraction** can also lead to light deflection near a star.

Second, if SRT is not correct (as we shall show soon), then photon can have mass. A photon with mass of course will be attracted by gravity and change its direction of flight.

These two kinds of light deflections all look like similar to the situation in Fig. 2.4

Black Holes and Super Dense Stars

GRT predicts the existence of black holes, that is, when the density of a star is so high, its gravity bends the nearby spacetime to such a degree, even photons cannot escape. However, GRT cannot explain the gamma radiation near a black hole, for which the famous Hawking Radiation ([B1][D10]) is meant to explain. However, the quantum mechanics theory Hawking used also need to be overhauled (see later chapters of this book), therefore the application of GRT to black holes is not successful. Worm holes and back to the future all sound so fantastic today, but will become a big joke years later.

Cosmology

Modern Cosmos model is built on top of ECE ([C10-C17][C19-C21]) and Hubble's Law ([E4]). On the modified ECE, an isotropical solution, Friedmann-Lemaître-Robertson-Walker

Metric ([D11]), is obtained, and it is confirmed later by the cosmic background microwave radiation ([C46][E36]).

This Cosmology also has many flaws. First of all, both Hubble's Law and the cosmic microwave background radiation can have other explanations, for example, photon's **Temperature Redshift** ([D6], also see Appendix A of this book) and **Star Cloud Redshift**. Therefore, the universe may not expand at all. Not only dark matter has never been found and the prelife of the universe before explosion cannot be explained, GRT per se will be disproved shortly. As such, the Big Bang theory that represents modern cosmology cannot hold.

2.2.4. Main Formula of GRT Contains Serious Flaws

Physics community has found some obvious flaws in GRT, for example, the singularities. These singularities are different from the singularity (where r => 0) of Newtonian gravity theory. Here we shall summarize only these singularities, but not discuss them in detail:

1. Curvature Singularity: when a geometric parameter in spacetime, for example, the Ricci tensor, approaches infinity, then curvature singulary arises ([C47]).
2. Future Singularities: including the forever static Schwarzchild interior Black Hole Singularity ([D12][C48)，ring-shaped ever-rotating Kerr interior Black Hole Singularity ([D12][C48), and the BigCrunch Singularity ([D13]).
3. Past Singularities: including singularities caused by gravitational collapse of Friedmann-Lemaître-Robertson-Walker metric or real body ([D14]), and the Big Bang singularity of those describing the geometric beginning of spacetime ([E38]).

These problems are unavoidable in the main formulas of GRT. But actually, singularity issue is not the main problems of EGE and ECE at all. The main problems include the following two problems that have been completely ignored by the physics academy:

1. **The structural relation between (gravity) Attractor and Attractee is ignored**: All GRT equations ignore the fact that gravity involves mutual interation of two bodies. Gravity process depends on the status and their mutual (structural) relation of both Gravity Attractor (e.g., a star) or the Gravity Attractee (e.g., a satellite). The structural Relations between Attractor and Attractee include the vectoral velocity, rotation, and spins, but they are not reflected in both EGE and ECE.
2. **Temperature is ignored**: In the whole GRT research, temperature is almost completely ignored. A major reason is, in the EGE and ECE, temperature has no place to stay. But we know for stars, temperature is a major parameter, and thermal energy is one of the major forms of energy. Any cosmos equation that does not include temperature is incomplete.

We all know that in the 3D space, velocity is a vector. Any particle (Atrractee) of velocity **v** (a vector), to convert its velocity to spacial coordinate, or to interact with space coordinate or physical item, always takes the form of vector multiplication **v**t. But in Minkowski spacetime, c is a scaler, and has no direction. But we know that when any particle (including photon) interacts with gravity field (Attractor), neither the value nor direction of the velocity can be ignored. But in GRT, whatever the particle speed is and whichever direction it goes, the same EGE or ECE is used and the same scaler c and imaginary number *i* is multiplied. That is, the

EGE and ECE have nothing to do with the mass, speed value and motion direction of any particle in the field.

As a matter of fact, not only GRT, almost all field theories, have the problems above. Here we only bring this issue forward.

2.2.5. Main Assumptions of GRT Do Not Hold

By now, we have already presented many reasons why GRT cannot hold. But so far, the criticisms are all of indirect, informal, and picky nature. We still need to do the more direct and rigorous disproof on GRT. We now do this work with four reasons.

Minkowski Spacetime has no Physical Meaning

What is physical meaning? It means, observability or actual happening of things. Otherwise, things observable have only mathematical or imaginary meaning. In mathematics, you can use an imaginary number *i* to connect time t with space coordinate X, so to produces a Minkowski spacetime coordinate *i*ct+**X,** and further to perform Minkowski metric (like Eq. (2-20) on it, but in physical world, how time t and space **X** can convert to each other (or at least interact with each other)? If this question cannot be answered, or the conversion between time and space be observed, then Minkowski spacetime coordinate *i*ct+**X** has no physical meaning at all. But GRT builds its whole foundation on spacetime and consider minimizing the energy change in it as the major physics principle. This is a fundamental mistake.

Physicist must tell us, how time and space are mutually converted or mutually interacted. It is ok to treat spacetime as an axiom, provided it is self-evident, conforms to our sensual experience, and can be directly observed or measured.

Readers may still find it difficult to understand why Minkowski space time coordinate *i*ct+**X** has no physical meaning. One of the reasons is, the definition of time today, in either physics or philosophy, is not well versed. In the next chapter, we shall solve the time definition issue. After we have a correct understanding or time, it is then very clear, time has nothing to do with space. They are completely independent.

In Physics, imaginary number *i* is used in another place, the wave function of Schrödinger Equation, which is complex. To this date, the physics academy cannot explain why a probability function must be represented by a complex number, and wrong results will be got if real number is used. This is also one of the main defects of Feymann's derivation of Schrödinger Equation: he also cannot explain why a Gassian Kernel containing imaginary number *i* must be used. it is wrong to think that a (probability) wave function needs to use a complex number to represent. In a later Chapter we shall derive Schrödinger Equation from basic physics principles, and then show, the imaginary number *i* is there not at will, but has definite physical meaning. **All physical variables must and must only be represented by real numbers,** and there is only one situation in which a physical variable can be represented by a complex number. For a gravity field, using an imaginary number to combine time with space into a spacetime has no physical meaning.

Afterwards, we can conclude, for any two physical variables connected with imaginary *i* to have physical meaning, they must be able to convert to each other, other wise, they can have only mathematical convenience, but no realistic meaning in physics. That is to say, time and space cannot convert into each other, even if a squaring process is involved (which is mathematical, not physical). Mathematics has far more freedom than physics, that's why abusing mathematics is very likely to lead to absurdity.

Now let's take a look at the spacetime metric (2-20). Obviously, this metric is a process of taking derivative on space time coordinate *i*ct+**X** followed by an operation of taking square of the norm. An interesting thing here is, in the metric, time t, through a factor of light speed c, can make the same contribution to ds^2 as the space coordinate X. A big philosophical and physical question arises: how does a time t in an imaginary coordinate contribute to ds^2 **physically**? For **X**, it is quite simple, because |**X**| represents distance, and because the three coordinates of x,y,z are mutually perpendicular, $dx^2+dy^2+dz^2$ is the formula to calculate the diagonal length of a cuboid. $dx^2+dy^2+dz^2$ is meaningful because x,y,z are mutually perpendicular, and its validity depends on the setting up of x,y,z coordinate system. Once we have selected the direction of x, y can lie only on a plane. And once we have fixed x and y, because of the requirement of orthogonality among x,y,x coordinates, then z losts its freedom, and it can only have a selection of the positive or negative direction.

Now a philosophical question is, what is time t, really? How can it keeps the geometric relationships with x,y,z? that it, however we choose the directions of x,y,z, why t has no selection of direction, but needs only to multiply an imaginary i, then everything is ok? In other words, when we use $dx^2+dy^2+dz^2$, there is a requirement on the directional choice of them. But this *i*ct, no matter how the directions of x,y,z are chosen, is always the same. That means, the Minkowski spacetime and metric therein, has no support from real life experiences and observational evidences, as well as no philosophical support. Has anybody seen time is converted to space, or vice versa?

To this date, nobody has given a philosophically satisfactory definition to time. In RT, time is even a relative, elusive thing, and can change its value according to the relative speed of the observer. When we discuss the definition of time, we will resolve this uncertainty.

Concept of Spacetime Bending Invalid

A general idea of GRT is, the Minkowski spacetime will bend by gravity. Theoretically, **if gravity force can bend spacetime, so does any other, including (Newtonian) reaction force**.

For an object on Earth, the gravity force and the supporting force to it reach a balance. Therefore, if gravity can bend spacetime, then supporting force will bend it in a counter direction. Or, because the gravity force and support force are balanced, the total force on any particle at balance is zero, and therefore there will be no spacetime bending at all.

For a satellite rotating around Earth, it balances the gravity through centrifugal force. For the same reason, each particle on the satellite is also in a state at balance. Therefore, every point on the satellite experiences no spacetime bending at all. Even for photon, or a free fall spacecraft, the force balance is achieved through (Newtonian) reaction force, or the adjustment

of its state. As such, the spacetime it goes will neither bend. Here, we must emphasize, for a particle of mass m with acceleration a, the force balance on it is achieved through the balance of reaction force -ma with action force F=ma. So to speaking, all particles in the universe, are always at balance with forces.

In summary, spacetime bending in GRT is a pseudo concept.

GRT Contradicts with SRT

In [D5] (see also Appendix B), we have proven that, if SRT holds, then photon does not have the isotropy property in a gravity field. The field equations in GRT (including EGE and ECE) all have a hidden assumption: gravity field is isotropical. Now that SRT is the foundation of GRT, SRT per se invalidates the foundation of GRT. Here we shall state in a few words on why, according SRT, the isotropy of photon in a gravity field is violated. Detailed discussion is referred to [D5] or Appendix B.

By SRT, photon has no mass, but a constant speed. Then photon in a gravity field, has two things can change, frequency or direction of motion. Because photon's wavelength λ and frequency μ has the following relation with peed c

$$\lambda = c / \mu \tag{2-32}$$

When the frequency increases, wavelength will be reduced, and vice versa. **If the photon's velocity is perpendicular to gravity field line**, then photon can change its direction to balance the gravity force; in this case, gravity does no work with photon. If photon's velocity is parallel to gravity force line, then photon can only change its frequency (and hence wavelength) to balance gravity; in this case, gravity does work to photon. If photon's velocity has an angle with the gravity force line, then we have to decompose the gravity force into two components, one parallel, the one perpendicular to photon's velocity. As such, when the photon's velocity direction is unknown, any gravity field defined by GRT has no meaning at all.

In summary, if SRT holds, GRT cannot. A bad news is, SRT is also invalid.

SRT Is Invalid

The biggest blow to GRT is by far the fact that SRT is also not valid. If SRT does not hold, then there will be no Lorentz Transform, light constancy assumption, and Minkowski spacetime, and everything goes back to Newtonian space and time. Then, the whole RT and the modern physics built on the foundation of it all collapse.

The disproof of SRT takes many pages and will be provided in the next section.

Based on the four rigorous reasons above, GRT is invalid.

2.3. Disproof of SRT

Now we start the most important work of this chapter: to give SRT a rigorous, formal disproof. The disproof is also on four grounds.

SRT has already existed for over 100 years and has become a base stone of modern physics, and its application to many areas has been considered successful. If there is nothing wrong with it, any modification or improvement will be futile, because a step further away from truth is fallacy. The author struggled many years with RT because of the difficulty to accept the explanation of the twin paradox and the train-tunnel paradox. Until I found that GRT cannot hold, I decided to take the pain to resolve the legitimacy of SRT. This section is a summary of this work.

My dissatisfaction with SRT also includes the fact it cannot easily and straightforwardly handle acceleration and rotation. This only means it makes mathematics messy and nonlinear. If God indeed sets such a law, we are hopeless. What if God likes simplicity and beauty?

2.3.1. The Paradoxes arising from SRT

Over the past 100 years, many paradoxes about SRT have been found ([D1-D4][D7-D8]). But these paradoxes still did not prevent SRT from becoming the foundation of modern physics. One of the reasons is the "Relativity of Simultaneity" reasoning, which has been accepted by physics community and used to justify the paradoxes. In the light of today, this is a hidden sophistry.

I became suspicious that SRT is wrong at the foundation level after I discovered many enhanced twin paradoxes and train-tunnel paradoxes, and constructed a "Missile-Well" paradox. Because the "Missile-Well" paradox is the first paradox that defeats the "Relativity of Simultaneity" argument, we discuss it now in detail.

First of all, we need to introduce two new principles, **Ordering Invariance Principle and Structure Invariance Principle**. These two principles are above the assumptions that light speed is constant and time is relative. Hence, they can be used to help us to make judgments.

Use the inertia reference frames in Fig. 2.1. Assume e_i is an event in reference frame S that occurs at time t_i and position x_i, i = 1,2, ..., n, where x_i is a coordinate in S (x_i is parallel to the relative velocity between S and S'). Also assume that x'_i and t'_i, i, = 1,2, ..., n, are the measured values of coordinate x_i and t_i in reference frame S'.

(Event) Ordering Invariance Principle (OIP):

For any l≠m,

$$x_l \le x_m \Leftrightarrow x'_l \le x'_m, \quad t_l \le t_m \Leftrightarrow t'_l \le t'_m, \quad l, m = 1, 2, ..., n \qquad (2\text{-}33)$$

wherein <=> represents equivalence relation. That is, the **(event) ordering (including position and time) is invariant in both inertia reference frames**.

(Event) Structure Invariance Principle (SIP):

For any i≠j, k≠ m, i, j, k, m ∈ {1...n} （∈ means "belonging to"）, we have

$$(x_i - x_j) / (x_k - x_m) = (x'_i - x'_j) / (x'_k - x'_m), \quad (t_i - t_j) / (t_k - t_m) = (t'_i - t'_j) / (t'_k - t'_m) \qquad (2\text{-}34)$$

That means, **the ratios between the differences of (event's) positions and times are invariant in the two inertia reference frames.**

In daily language, the ordering of events occurring in frame S is to be observed the same

as in frame S'; the ratios between the differences of (event's) positions and times will not change due to motion. Our disproofs of SRT hereafter do not depend on these two principles, therefore, we are not giving the proofs to them here. They are introduced here because they help a lot in understanding the fallacies of RT.

For rigid or elastic motion, even if there is acceleration involved, the OIP above remains valid. However, for SIP, although it also tolerates acceleration, valid for only rigid motion. The principles expressed above are for linear motion only. For curved or rotational motions, then expressions are more complicated, involving rotational invariance.

Now, let's discuss the "Missile-Well" paradox that originates from the Train-Tunnel paradox.

"Missile-Well" Paradox

As seen in Fig. 2.5, A Missile has three parts; the Head, Tail, and Body. Correspondingly, a Well has three blocking parts: Mouth, Waist, and Bottom. The Head can pass the Mouth and Waist, but not the Bottom; the Body can pass the Mouth, but not the Waist, and the Tail is blocked by the Mouth. Missile and Well all have a static length L, in which, Head has a length 0.8L, and Body 0.2L, while Waist is in the middle point between Mouth and Bottom (at 0.5L).

Now, Missile enters the Well at a speed v=0.8c. In this case, according to Eq. (2-16), the Lorentz factor $\gamma=1/\sqrt{1-0.8^2c^2/c^2}=1/0.6$.

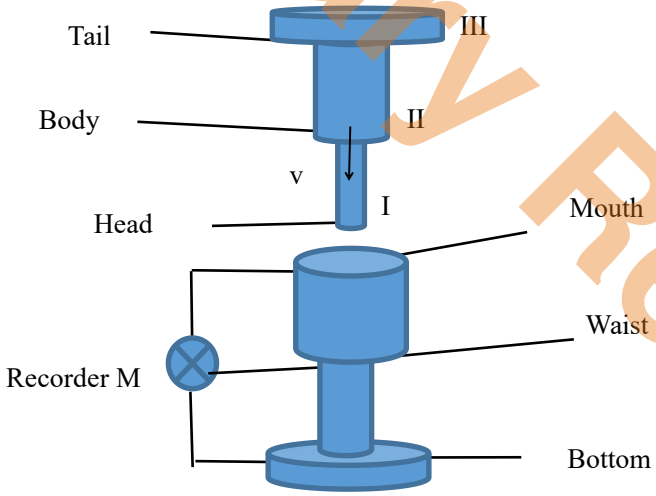

Fig. 2.5. "Missile-Well" Paradox

See Fig. 2.5, a collision recorder M is used to record the collision time on Mouth, Wasit, and Bottom of the Well (assume the recording error is small enough to be ignored). Similarly, Missile can also have a black box to do the collision recording, but the results will not be changed, the reason is, no matter which parts collide first, for collision, both the Missile and Well must have the same collision ordering. That's because collision is a two-party event, both must a relevant part to collide. That means, any parts of the Missile, collide with only one part of the Well, and a collision event is unique for both Missile and Well. Assume that the blocking

materials on the Well is weak and has no substantial effect on the speed of the Missile. That means, every part on the Missile will not (substantially) change speed during collision.

When Missile enters Well, as shown in Fig. 2.6, Missile sees that its Head and Body still have length 0.8L and 0.2L respectively, but due to Length Contraction, the whole length of Well is reduced to L/γ ＝ L ＊ 0.6 = 0.6L, and the distance if the Waist to Mouth and Bottom has been reduced to 0.6L/2=0.3L. Therefore, Missile sees the following collision order:

(I) Head hits Bottom;
(II) Tail hits Mouth (as Body's length is now 0.2L, smaller than the distance 0.3L of Waist to Mouth); and
(III) Body hits Waist.

We shall call this as the collision ordering seen by Missile as I-II-III.

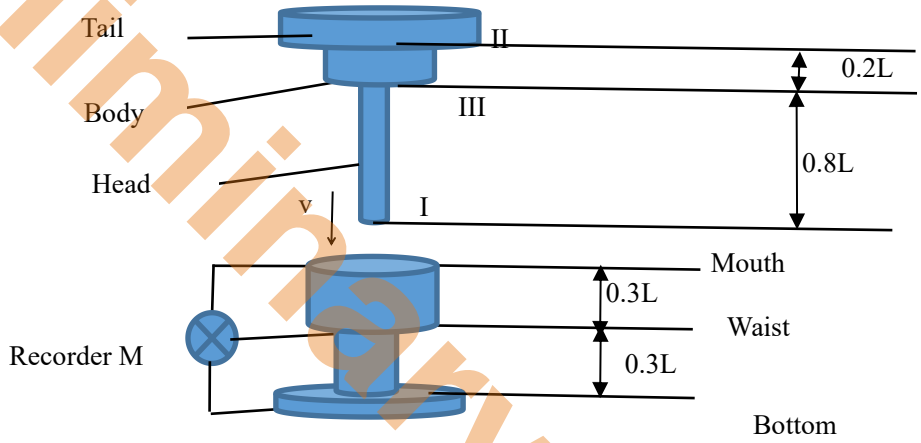

Fig. 2.6. Observations of Missile

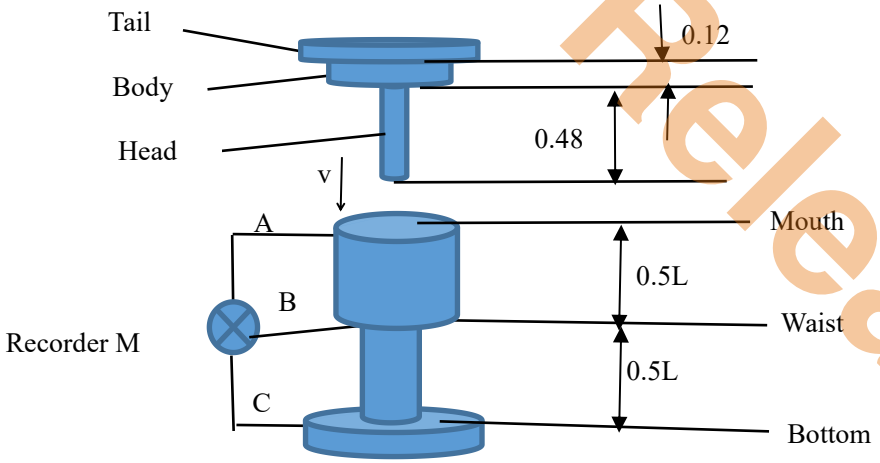

Fig. 2.7. Observation of Well

Now, from the view point of Well, as in Fig. 2.7, when Missile approaches with a speed of v = 0.8c, Well still has a length of L, and the distance of Waist to Mouth and Bottom remains 0.5L, but due to Length Contraction (of Missile this time), Head has only a length 0.8L* 0.6 = 0.48L, and Body a length of 0.2L * 0.6 = 0.12L. As such, Well will see the following collision

ordering:

(A) Tail hits Mouth;

(B) Body hits Waist (because Head's length is now 0.48L, smaller than the distance 0.5L of Waist to Bottom, so Head can be fully contained in the space between Waist and Bottom); and at last,

(C) Head hits Bottom.

We shall call this as the collision ordering seen by Well as A-B-C.

However, the collisions A-B-C as seen by Well involve parts on Missile, and the collisions of these parts, from the point of Missile, correspond to the collisions II-III-I respectively. How can two different collision sequences of I-II-III and II-III-I happen a the same time in a single collision event?

As a third possibility, if Length Contraction does not happen, then Collision I/II will happen at the same time, followed by collision III. That is, if there is Length Contraction, the collision ordering is I/II-III.

In fact, this "Missile-Well" paradox, can serve as an experiment to invalidate SRT.

Because collision is an event that requires two parties to participate **simultaneously**, and Lorentz Transform does not change the event ordering, so that if Mouth has a collision, then Tail must have collision at the same time, and so on. Changing a reference frame does not change the fact that a collision involves two parties at the same time. Physically, there can be only one collision ordering (for Missile and Well). The sizes of Mouth, Waist, as well as those of Head, Body, and Tail, determine that Head can only collides with Bottom, Body only with Wasit, and Tail only with Mouth. No other collision is possible. In short, **Missile's collisions have a 1-1 definite correspondence with Well's collisions.** The collision ordering of Missile determines that of Well, and vice versa. **This is a direct proof of the OIP of (physical) events: Lorentz Transform cannot change the event ordering.** So Missile and Well can have a common ordering of collisions. **Whichever ordering it is, I-II-III or II-III-I, SRT is contradicting itself.**

If we are to uphold the logical principles that represent the highest sublimation of human wisdom and serve as the foundation of all sciences, then we have to come to the conclusion: SRT is invalid.

That is, in the "Missile-Well" paradox, we use the measurements of collision ordering of the parts of Well to avoid the simultaneity issue of time measuring in different reference frames, so to defeat the "Relativity of Simultaneity" argument used by supporters of SRT. To emphasize, when a collision occurs, both parties must be involved simulteneously, and the ordering of collisions, for either Missile and Well, must be exactly the same. As a result, the fallacy of SRT is exposed evidently.

LT cannot change the ordering of events in either reference frame, while in the "Missile-Well" Paradox, it needs (but fails) to change the ordering of observed physical events in order to avoid self-contradiction. **Here, the "Relativity of Simultaneity" argument fails to**

change the ordering of observed events. Because of OIP, the ordering of collisions, whoever measures, can be comparable without worrying about each other's clock, so to avoid the incomparability raised by the "Relativity of Simultaneity" argument.

Therefore, the "Missile-Well" paradox is a higher level paradox than the classic Train-Tunnel paradox, in which, LT must reverse the ordering of time and position in one of the reference frames to avoid self-contradiction. Please note that this paradox involves only two reference frames. That is to say, SRT is not even self-consistent when only two inertia reference frames are involved. We shall show later, when three or more reference frames are involved, SRT becomes completely an appalling absurdity!

2.3.2. Invalidation of Observational and Experimental Supports for SRT

The reason SRT has obtained great "success", lies in that there are uncountable tests directly or indirectly "support" the theoretic predictions of SRT. There is a thick book ([C49]) dedicated to observational and experimental evidences for SRT, and more advanced experiments keep pumping out ([D17][D18]). If scholars do not know where SRT is wrong and continue to do test along the thinking logic of SRT, they'll get repeated results one after another. When SRT was confirmed by only two experiments, the stellar deflection and Fizeau experiment, Einstein said, "that's enough", because in his view, that's enough to prove the correctness of the basic principles in SRT. In the below we'll know, too many coincidences lead to the faulty success of SRT.

In the previous section we already pointed out, due to the fact that GRT brings forth almost 20 more parameters, so that its adaptability (to all kinds tests) is so much stronger than Newtonian gravity theory. As such, many of the precise data matching, do not reflect the true physical laws underneath. Then, why SRT also has the supports from so many tests, given the fact it involves only a single parameter, the relative speed v? There are 5 reasons:

1. About half of the tests come from GRT tests. And the representatives of them have been examined and nullified in the last section.
2. The assumption of constant light speed in SRT is wrong in the generic sense, but is correct in special circumstances, and hence can be consistent with some experiments.
3. Many of the tests, did not use the reciprocity principle to test in both reference frames, and drew conclusions based on tests on only one reference frame.
4. Some tests claim to support SRT, but actually they invalidate SRT. Many echo-type scholars do not even know what can be called a strict proof, so for whatever purpose, once they find something beneficial to SRT, they are eager to make announcements. It is hardly emphasized that for time dillation and length contraction, seen from the other reference frame, must also have the same conclusion, and thus lead to contradiction. And a contradicting conclusion is a disproof, but not a proof, of SRT.
5. Photon has many special properties, about which we still know little today. This book will disclose some new properties of photon and propose a new theory about it. Many phenomena atrtibuted to SRT in the past can be explained by new knowledge of photon, so to avoid the fallacies arised in SRT.

There are too many tests related to SRT, and their errors are all similar, therefore, we shall examine only the representative classic or important ones here. After we directly point out the errors of SRT in its derivation process and basic assumptions, it becomes quite easy for readers to discern the fallacies in SRT.

Fixeau Experiment

Fig. 2.8 shows a setup of the Fizeau experiment, wherein M is a mirror, BS a beam splitter, and the arrows in the green pipe represent the flows of water. This experiment is used to examine the impact of Ether's motion to photon. The original light at the upper left corner passes through the beam splitter and mirror, split into two beams, each passing through water flowing in reverse direction, and then the wavelength change is observed by the interferometer (symbolized by the eye graph) at the lower right corner, from which the light speed in the two water pipes can be obtained.

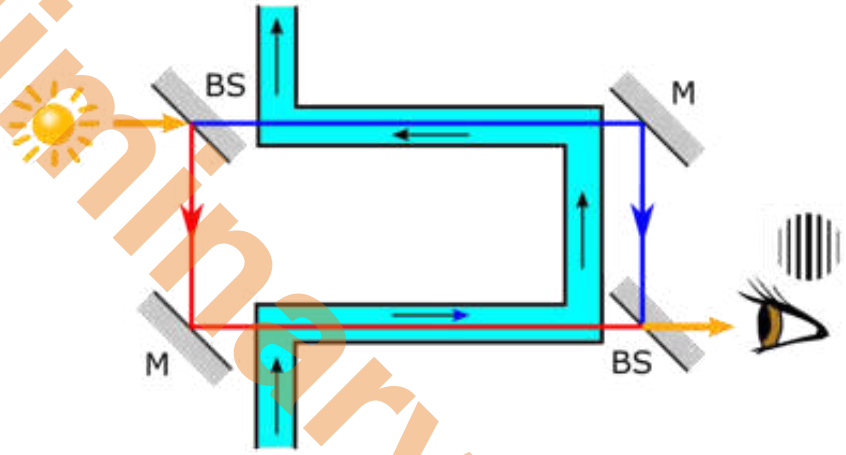

Fig. 2.8. Fizeau Experiment（Credit to Wikipedia）

Apparently, according to the traditional ether theory, if water has a dragging effect on photon, then photon's speed w_+ in the lower pipe in Fig. 2.8 should be

$$w_+ = c/n + v \qquad (2\text{-}35)$$

wherein n is the refraction rate of water, c the light speed in vaccum, and v the speed of water. However, what Fizeau discovered was

$$w_+ = c/n + v(1 - 1/n^2) \qquad (2\text{-}36)$$

This discovery of Fizeau, can be explained by the ether drag theory of another French scientist, Fresnel, although his theory becomes invalid when applied to other experiments. Because Fresnel's ether drag theory failed in the generalization process, at the time SRT was born, Fresnel's ether drag theory was overthrown completely. That's very unfortunate.

In 1907, two years after SRT was published, German scientist Max von Laue, added the water speed and light speed in the static water using the peculiar speed addition method of SRT ([C1-C5]), and he obtained

$$v_m = \frac{v_n + v}{1 + v_n v / c^2} \quad , \quad v_m - v_n = \frac{v_n + v}{1 + v_n v / c^2} - v_n = \frac{v(1 - 1/n^2)}{1 + v/(cn)} \qquad (2\text{-}37)$$

Wherein v_m is the measured light speed after addition with the water speed, and v_n=c/n ia the light speed in static water.

After v/cn is ignored, Eq. (2-36) can be obtained from Eq. (2-37).

Afterwards, SRT becomes famous immediately. Very unfortunately, this is just one of the coincidences, obtained through approximation.

Two issues must be pointed out here. First, this experiment does not need SRT to explain. Fresnel's explanation is well sufficient. Though a generalization of Fresnel's theory is not successful, that only means his theory does not explain many unknown photon properties. Second, this experiment cannot be counted as an evidence for SRT. Why? To understand this assertion we need to examine Cherenkov Effect.

Nevertheless, we must say, SRT is not invalid everywhere. There are always some application scenarios in which SRT is approximately satisfied. In such situations, SRT is applicable. This is one of the reasons that SRT obtained many experimental support in the early days. But, when SRT is generalized to all cases, e.g. in the Cherenkov Effect below, it will face many problems.

Cherenkov Effect

In 1934, ex-Soviet scientist Pavel Cherebnkov discovered, in a media, when particle moves with a speed βc（β>1/n，n the refraction rate of the media) faster than the light speed in that media, electromagnetic wave is excited, and the speed of which is the same as light in that media, as shown in Fig. 2.9, wherein t is time, θ the angle between the motion direction of the excited photons with the velocity of the particle. In the figure, red arrows represent the high speed particle, blue arrows the electromagnetic wave (i.e., photons). Afterwards, The colleagues of Cherebnkov, Igor Tamm and Ilya Frank gave a theoretic explanation based on SRT, and shared the 1958 Nobel Physics Prize with Cherebnkov.

Cherenkov Effect is a very valuable discovery, worth many more study by physics academics. Though is has obtained an explanation from SRT, the effect an also be used to invalidate it. We shall now see how.

First of all, an interesting fact is, a particle in a non-vacuum media can have a speed faster photon in that media. Assume the refraction rate of the media is n, and the speed of particle P is v_p, then it is possible $v_p > c/n$. We know that the speed of photon is c/n in the media, and when it leaves the media to vacuum, its speed will become c. Then when the particle with speed $v_p > c/n$ leaves the media and enters vacuum, what is its speed? SRT says in a vacuum, nothing can exceed photon speed c. But who is blocking particle P so to limit its speed to c or less?

We don't know what is going to happen when the particle, with its speed $v_p > c/n$, leaves the media, but this is an experiment that may deserve a Nobel Prize. Fig. 2.9 shows a setup for such an experiment, where v_p is the particle speed in the media, and v_v the particle speed in the

vacuum. There are three possibilities:

1. $v_v > c$: In this situation, SRT is violated.
2. $v_v < c$: This is strange. Why the speed of the particle, which is faster than photon in the media, is slower than photon in the vacuum?
3. $v_v = c$: In this situation, it is impossible for all particle mass to have light speed, otherwise the electric charge on the particle will have no mass as carrier. Then, the mass portion that carries the electric charge must have a speed smaller than light speed c, or SRT is also violated. So, in this case, part of the particle is converted to photon with light speed c, and the other part still has mass with a speed less than c so to carry electric charge.

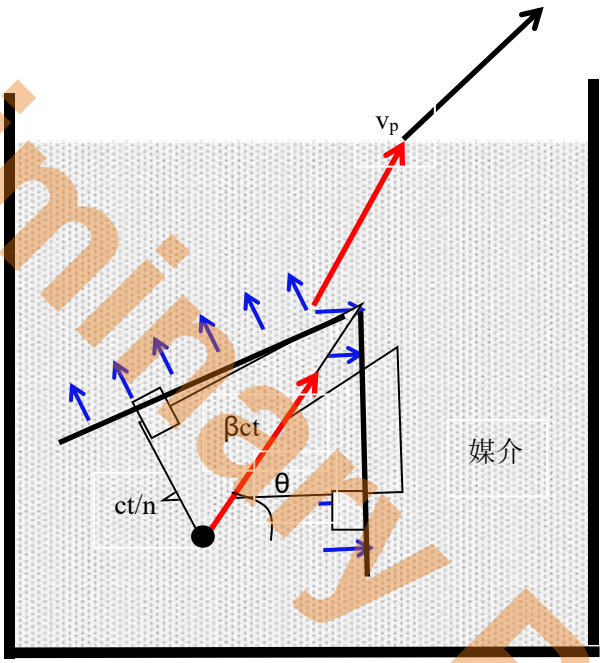

Fig. 2.9. Cherenkov Effect

In summary, if SRT is correct, in the Cherenkov Effect, when particle leaves the media, at least a portion of its mass must have a speed less than photon speed. If this indeed is the case, then it looks like compatible with SRT. The real problem is next.

Now comes the second question. If in the Cherenkov experiment, the media is not static but moving with a speed v with respect to the laboratory, then what is going to happen? According to the speed addition formula of SRT, this speed is given by

$$w_+ = \frac{v_P + v}{1 + v_P v / c^2} \qquad (2\text{-}38)$$

where w_+ is the combined speed of the particle measured by the observer. This speed, according to SRT, should be less than light speed c. However, if the ether dragging theory of Fresnel (or the Fizeau empirical formula) Eq. (2-36) also applies to the particle in Cherenkov experiment, then assume $v_p = \alpha c/n$ ($\alpha = \beta n > 1$), we shall get

$$w_+ = \alpha c / n + v(1-1/n^2) = \beta c + v(1-1/n^2) \quad (2\text{-}39)$$

Now assume v = κc. When κ satisfies

$$\kappa > (1-\beta)/(1-1/n^2) \quad (2\text{-}40)$$

the combined particle speed w_+ in Eq. (2-39) shall exceed the light speed c in the vacuum.

That is to say, if particle's speed in a media is larger than photon speed in that media, then through the dragging effect, it is possible that the combined speed of the particle dragged by a flowing media is larger than photon speed c in the vacuum, unless new experiment disproves it.

At this point, we don't know yet if Fizeau Eq. (2-36) still applies to Cherenkov Effect and fast moving media, but since this is the only experimental result we have, we must respect it for the time being. In addition, what if the whole container in Fig. 2.9 is on a high speed rocket?

Now the third problem, also the most critical problem raised by the Cherenkov Effect, is about the derivation environment of the original Lorentz Transform. In Section 2.1.1 when we derive LT, we assume all reference frames are in a vaccum, where photon has the highest speed. Now consider a local environment full of a media with refraction rate n, let's consider the LT in this local environment.

First, in this local environment, photon's maximum speed is c/n. But photon is not the fastest in this environment, then why would it be the fastest in the vacuum?

Second, in this environment, if we use the same methodology as in Section 2.1.1, then we need to find out the maximum particle speed v_{Max} that is possible in the media. According to SRT, this v_{Max} cannot exceed vacuum photon speed c. If it is smaller than c, then obviously, in the LT of this environment, in the Eq. (2-16) of the Lorentz factor γ, c must be replaced by v_{Max}, i.e., $\gamma=1/\sqrt{1-v^2/v_{Max}^2}$. v_{Max} cannot be equal to c, otherwise, any particle with this speed must be converted to photon, and a photon has a speed of c/n in this media!

So, according to SRT, we can draw the following corollary: in the Cherenkov experiment, the particle in the media cannot reach photon's vacuum speed c. And in this environment, standard LT is no longer valid, and a modified LT must be used, in which c must be replace by v_{Max}. In this new media and new LT, photo speed c/n is less than v_{Max}. Now that photon's speed is smaller than v_{Max}, won't it behave like an ordinary particle and has mass? Now that the particle faster than photon has mass, why can't photon has mass? As for the particle that has maximum speed v_{Max}, why won't it lose mass since γ = ∞ when $v=v_{Max}$? If it loses mass, isn't it a photon as defined in SRT?

All of these cannot be answered with existing photon theory and SRT.

Michelson–Morley Experiment

Another important experiment that supports SRT is Michelson–Morley Experiment (1887), as shown in Fig. 2.10, wherein light source (red) is split (into green and blue lights) by beam splitter, and then through reflection by mirrors, converge again (as shown by black arrow) in the interferometer .

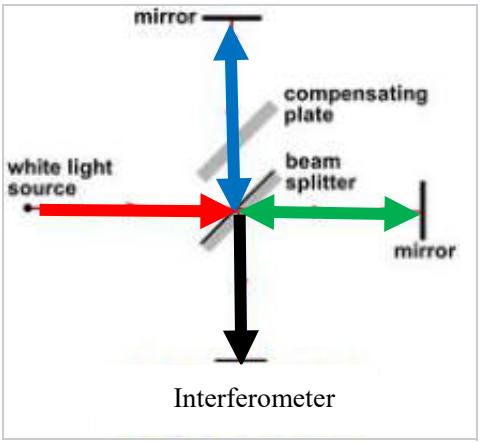

图 2.10. Michelson–Morley Experiment

This experiment was also used to check the ether effect. The early light wave theory in the 19th century thinks that light wave, like sound wave, needs a media to travel. Physicists regard the media in the vacuum, through which light travels, as ether. In this experiment, the motion of ether is considered as horizontal, and photon flies in the ether at a fixed speed. Because the motion of Earth's surface relative to ether is basically horizontal, according to the ether theory and Newtonian velocity combination method, it can be concluded that, the time used by photon in the horizontal round trip (green arrow in Fig. 2.10) is longer than that in the vertical (blue arrow in Fig. 2.10). Detailed computation can be found in [C6]. However, the measurement in the experiment shows that the two times have almost no difference. This seems to confirm the constant light speed assumption in SRT.

But, we need to point out, the dragging theory of Fresnel, i.e., Eq. (2-36) adapted to air, can also be used to calculate the time difference of photon's horizontal and vertical trips. Because the refraction rate of air on Earth's surface is only 1.00027, and Earth's motion speed is far smaller than light speed, from Eq. (2-36), it is obvious that, the effect of Earth's motion to the time difference of the two trips is negligible.

On the other hand, this experiment is quite similar to the Fizeau experiment, it is also one of the few scenario where Lorentz Transform is valid. That is to say, while SRT is invalid in general, in some practical cases, e,g., when motion speed is far less than light speed, LT can give correct or close to correct results.

There are many other similar experiments regarding ether (([C49][D19][E41]), including the Oliver Lodge Experiment (1893), Hammar Experiment (1935), Michelson–Gale–Pearson Experiment (1925), Kennedy–Thorndike Experiment ([E42], 1932), Ives–Stilwell Experiment ([E43-E44], 1938/1941), just to mention a few. The purposes of these experiments in the early days, were all to refute the wrong ether drag theory represented by Eq. (2-35). To the Fresnel

theory or the empirical ether drag formula Eq. (2-36), SRT has no advantage at all. On the contrary, the logical error and the mix of true and false assumptions in the SRT, lead astray the whole modern physics.

For the same reasons above, the Sagnex Effect (1913) also cannot prove the correctness of SRT, because its situation is quite similar to the Michelson–Morley Experiment. Others like Trouton-Noble Experiment and Raleigh-Brace are similar as well, from which no definite conclusions can be drawn.

Stellar Aberration

Another test that significantly boosted the confidence of Einstein is Stellar Aberration ([C50-C51][D20-D21]). This test can be described with Fig. 2.11, where solid line represents the light ray observed when a star and Earth are mutually static, while dotted line represents the light ray observed, but deviated from reality, when motion exists between a star and Earth.

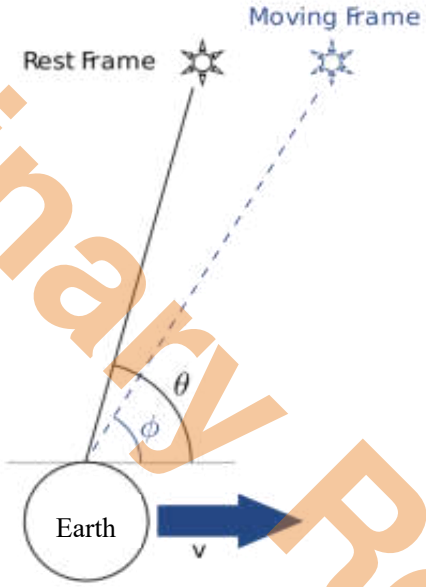

图 2.11. Star Aberration (Credit to Wikipedia)

This problem looks as if an Ether Dragging problem, and can be well explained by SRT. But, all existing explanations ignored a very important factor, the **Star Cloud Refraction** mentioned earlier. The density of star cloud around a star is not uniform: the farther away from the star center, the lower the density of star cloud. Therefore, when light leaves from star, light ray will be refracted, as shown in solid red lines in Fig. 2.12， wherein dotted red line reflects the illuded star direction by Earth observer (actually light ray inside the Star Cloud is curved, but not straight, so the lines reflect effective approximations). In this figure, due to Star Cloud Refraction, if Earth observer infers the direction of a star through the light ray he sees, he'll be illuded by Star Aberration. In this figure, Star Cloud has the same effect as a grading lens with nonuniform density.

This example shows, because astrophysicists and astronomers ignored Star Cloud Refraction (as well as Star Cloud Redshift), so that they could not explain Star Aberration, and

hence gave SRT another loophole.

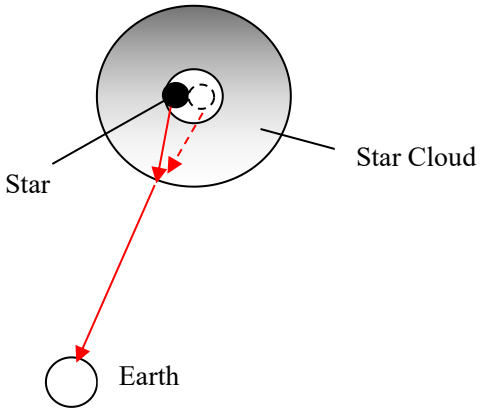

图 2.12. 星云折射效应示意图

Up to now, the tests that paved the foundations of SRT, can all be explained with physical phenomena making more physical sense, and hence, SRT has to compete with these explanations in a more equal way. Howerver, due to the intrinsic logic error and invalid basic assumptions, SRT is disqualified as a competitor. In later chapters we shall present an improved new theory of photon, which can also explain such observations, but do not have intrinsic logic errors as in SRT.

Classic Time Dillation Tests

On time dillation, there are many classic tests, as well as their improved versions. They include Kennedy–Thorndike Experiment ([E42], 1932), Ives–Stilwell Experiment ([E43-E44], 1938/1941), Mössbauer Rotator Experiment ([E45-E48], 1960). Due to length restriction, we cannot cover all time dillation experiments here, but only a few representative ones. From these, we can already see, those which have been regarded indisputable facts by scientists in the past, all look so absurd today.

Kennedy–Thorndike Experiment

First let's take a look at the Kennedy–Thorndike Experiment. it is a qualitative experiment, hoping to testify length contraction and time dillation. It is similar to the Michelson–Morley Experiment, the difference lies only in that in this experiment, the trip length in the horizontal and vertical directions are different. Using the Fresnel dragging explanation Eq. (2-36), the dragging effect of ether can again be completely neglected.

In this experiment, we must point out here two facts that are often ignored by physicists:

1. **Ether (atmosphere) in the lab. environment (separated by walls), has almost zero relative speed with Earth.**
2. **Photon, at the very moment of emitting, includes already the relative speed between ether and Earth, which is negligible in the lab environment.**

In the first case, the relative motion between ether and Earth is due to the motion of Earth. Because of gravity, atmosphere moves with Earth. Where there is no wind or walls exist (as in lab. conditions), ether is static with respect to Earth and equipment.

In the second case, photon emitter already contains the relative motion between Earth and ether (atmosphere). Therefore, in this case, the experiment can be well explained without SRT's constant light speed assumption.

As such, Kennedy–Thorndike experiment cannot draw any conclusions, and is hence nullified.

Ives–Stilwell Experiment

On Ives–Stilwell Experiment, disputes already exist in the physics circle. For example, references [C52-C53] disagree about its conclusion. Many new computation formula continue to emerge. The basic methodology of Ives–Stilwell Experiment is as follows. The experiment measures the light frequency emitted from high speed moving H_2^+ (or its isotopy H_3^+) ions. This frequency differs in the Doppler effects computed from classic physics and SRT. Because many literature, including the original papers, did not explain the principle of this test very well, so we shall explain it with a new diagram, as shown in Fig. 2.13.

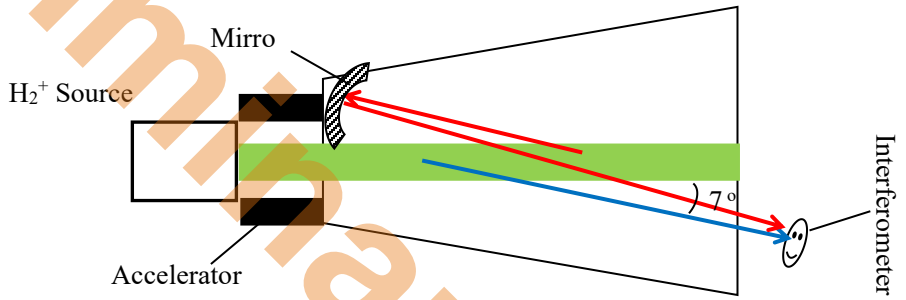

图 2.13 Ives–Stilwell Experiment

In Fig. 2.13, the source, emits H_2^+ or H_3^+ ions, and these ions can emit light at high speed. The hydrogen ions are accelerated forward by the electromagnetic accelerator under very high voltage. At a 7^o angle biased from the motion direction of the ions, an interferometer is set up, and opposite to it, sits a curved mirror in the equipment chamber. When the ions moves forward with a high speed v, the photons emitted forward will have blue shift, while photons emitted backward will have redshift. Hence, by measuring the frequency (or wavelength) shifts of the two kinds of photons, the Doppler effect as predicted by SRT can be verified.

Let f_o be the frequency of photon before acceleration, and f_b and f_r the frequencies blueshifted and redshifted respectively after acceleration (see the blue arrows and red arrows in Fig. 2.13), then according to the Doppler Effect from classic physics, we have

$$f_b = (1\text{-}v/c)\, f_o, \quad f_r = (1+v/c)\, f_o \tag{2-41}$$

where v is the speed of hydrogen ions, and c the light speed.

But according to SRT, the blueshifted and redshited frequencies shall include a Lorentz factor γ (see Eq. (2-16)). From the classic literature regarding the Ives–Stilwell experiments, the blueshifted and redshifted frequencies obtained from SRT should be

$$f_b = \gamma\,(1\text{-}v/c)\, f_o, \quad f_r = \gamma\,(1+v/c)\, f_o \tag{2-42}$$

The classic Ives–Stilwell experiment has the following problems.

First, in the original Ives–Stilwell experiment, the speed of hydrogen ions is only 0.005c.

In this case, the $\gamma = 1/ =1.0000125$， so that $\gamma - 1 \sim 10^{-5}$. This small difference, is well beyond the overall accuracy (10^{-2}) of the experiment.

Second, Eq. (2-41) and (2-42) ignored a factor, $\beta=\cos(7^o)$. Because in Fig. 2.13, there is a 7^o angle between the interferometer and the motion direction of the ions, the correct formula for Eqs. (2-41) and (2-42) should respectively be

$$f_b = （1-\beta v/c) f_o, \quad f_r = （1+\beta v/c) f_o \tag{2-43}$$

and

$$f_b = \gamma （1-\beta v/c) f_o, \quad f_r = \gamma （1+\beta v/c) f_o \tag{2-44}$$

Obviously, in the measurements of redshift and blueshift of light spectrum, the changes caused by β is far lager than the changes caused by γ.

Third, the hydrogen ions from the ion source, has a basic speed v_o before acceleration. This basic speed is not zero. In this case, Eq. (2-43) and (2-44) need to be further modified as

$$\frac{f_b}{f_o} = \frac{(1-\beta v/c)}{(1-\beta v_o/c)}, \quad \frac{f_r}{f_o} = \frac{(1+\beta v/c)}{(1+\beta v_o/c)} \tag{2-45}$$

And

$$\frac{f_b}{f_o} = \frac{\gamma_v(1-\beta v/c)}{\gamma_{v_o}(1-\beta v_o/c)}, \quad \frac{f_r}{f_o} = \frac{\gamma_v(1+\beta v/c)}{\gamma_{v_o}(1+\beta v_o/c)} \tag{2-46}$$

Now compare Eq. (2-45) and (2-46), the differences of frequencies (or wavelengths) from classic physics and SRT can hardly be measured in this experiment.

Therefore, **Ives–Stilwell Experiment is again ineffective.** Now let's examine Mössbauer Rotator Experiment.

Mössbauer Rotator Experiment

This experiment has been done by many scholars ([E45-E48]). So we shall also do some discussion, from which we can see, if everyone looks from the same angle, blind spot results. This experiment can be described by Fig. 2.14， wherein, a γ-ray resonator is fixed on a piezo actuator mounted on a fast rotating axis, and the piezo actuator can produce a radial movement by electric voltage. A resonance absorber is fixed at the peripheral of the equipment, outside of which, sits a counter of absorbed resonance wave numbers. It is said that the accuracy of this experiment is 10^{-5}, while the Ives–Stilwell experiment above has an accuracy of only 10^{-2}.

In this experiment, rotation produce a transverse Doppler effect, while the piezo actuator can produce a longitudinal Doppler effect. This experiment claimed to have proven time dillation of SRT, because when time dillates, the number of waves absorbed by the resonance absorber will increase. Again, this looked the problem at only one side, but not the other side.

In. Fig. 2.14, we see a red arc, where "resonance waves can reach absorber". When the resonator is on this arc, the γ-ray emitted can be absorbed by the resonance absorber. Please note, on this red arc, photons fly a longer trip (dotted arrow) than when resonator stay horizontal (solid arrow). Therefore, more resonance waves can reach the absorber, and the absorbing count increases. That means, the increase of the absorbed resonance waves, can be attributed to the structural design, but not time dillation.

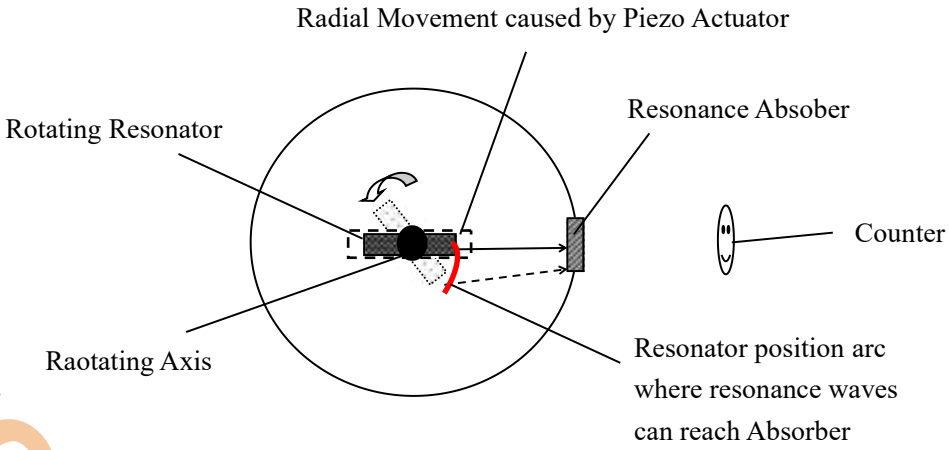

图 2.14 Mössbauer Rotator Experiment

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In addition, this experiment claims that the accuracy is now raised to 10^{-5}, matching the accuracy of γ (=1.0000125) in the Ives–Stilwell experiment. While the redshift phenomenon in the Mössbauer Rotator experiment is different to that of Ives–Stilwell experiment, the longitudinal redshifts from SRT and classic physics can also be described by Eq. (2-41) and Eq. (2-40) respectively. Now in this experiment, the speed of the piezo actuator is far smaller than 0.005c, so that the difference between Eqs. (2-41) and (2-40), i.e., the difference between γ and 1, is far more smaller than 10^{-15}.

That is to say，**Mössbauer Rotator experiment is again ineffective.**

Latest Representative Experiments

Many experiments above, have been repeated by follow-on researchers with higher precision. But because the basic methodology have not changed, the results can all be negated by the same reasons above. But the curiosity and suspicion toward SRT do not stop, and more experiments have been done using more advanced methods. Do these new experiments offer direct support to SRT? We shall discuss a few representative experiments here, and the rest are more or less the same.

Hafele–Keating Experiment

In this experiment ([E49]), atomic clock is carried to the airplane flying twice around Earth, one eastward and the other westward. Then the clock on the plane is compared to a twin clock on the ground, and the two clocks differ. The result is considered to support SRT.

How strange! This is an experiment actually disproving SRT, but is used to support SRT! Have they forgot the reciprocity of SRT? According to SRT, if the clock on the ground is taken to the airplane after the two trips, the clock on the ground should be slower. How can this be?

Many follow-on atomic clock experiments, like those in [E51-E53], all make the same mistake：use an obvious counter example to serve as an evidence to support SRT. That is to say, **all time dillation experiments, performed only on one side, but never on the other side.**

Retivisitic Energy and Momentun Tests

In particle accelerator experiments, many particles are accelerated to close to light speed, therefore, through the computation of particles' energy and momentum, SRT can be verified. Unfortunately, the whole modern physics is built on top of SRT, it is a serious logical error to use a theory depending on SRT to prove the foundation on which it is based! Only independent experiments can be used. Moreover, modern particle theories are also based on the wrong explanation of Schrödinger Equation, and the baseless Klein-Gordon and Dirac Equations. Such experiments also include the particle half-life observations ([E53]).

In later discussions we shall know, the Lorentz Transform in SRT involves only the observer and the observed. In such reference frames, only two subjects are involved, and SRT has some degree of logic self-consistency, and hence strong deceptivity. The "Missile-Well" paradox presented earlier still defeats SRT hands down.

The discussions on modern physics will be addressed in later chapters.

Tests based on GRT

Many tests based on GRT are also used to verify SRT. In Section 2.2, we already listed many, but all wrong "evidences" from observations or experiments related to GRT, so we will not repeat them here.

Valuable Experiments

The tests above, due to all kinds of reasons, cannot prove the validity of SRT. Not only so, they do not bring in new understanding to the physical laws. However, in the progress of SRT, there are some interesting experiments, which, though ineffective in validating SRT, may bring in some new insights to physical laws. We now discuss some of them.

Photon Emission Tests (proving irrelevance of initial emitter speed)

Early competitors with SRT include photo emission theories. Such theories have been proven false many times ([E54-E55]). Then, many dedicated experiments are carried out to prove that photon's speed is independent on the initial speed of emitter ([E56-E58]). These tests, though unable to prove SRT's assumption of constant light speed, still provide valuable empirical insights on the characteristics of light speed. The new theory about photons proposed

in later chapters, must be consistent to prior experiments.

Isotropy of Mass, Energy, and Space

SRT also has hidden assumptions about the isotropy of mass, energy, and space. These all look like granted, still physicists have done some experiments to verify them. These tests are mostly done in the particle domain ([E59-E60]), in which the symmetry of LT (in space) is involved ([E61-62]). Although according to this book, modern physics need rebuilding, and LT has no value in the future, these experiments are still meaningful references for the isotropy assumption of mass, energy and space, which is a basic assumption for any physics theory.

2.3.3. Hidden, but Fatal Logical Errors in Lorentz Transform Derivation

Then where are the fundamental errors in SRT? Except the invalidity of two basic assumptions, two fatal, but well hidden, logical errors exist in the LT derivation process. These two errors have been overlooked for more than 1 hundred years.

Relative Speed v in the LT Coming from Third Party

First, let's take a look at Eq. (2-17), in which, there is a speed v. An interesting fact is, this v, the relative speed between the two reference frames, was considered the same value in the Lorentz Transform derivation process. This is strange: the two reference frames have different time and length measurements, and yet, they can produce the same speed! So let's double check this absurdity now.

Do derivative operation to both sides of Eq. (2-17), and note that v is constant, we get

$$dx'/dt' = (\gamma (dx - vdt)) / (\gamma (dt - dx\, v/c^2)) = (dx/dt - v) / (1-(dx/dt)\, v/c^2) \quad (2\text{-}47)$$

What is dx/dt? That's the speed of frame S' relative to frame S, or v. So, from Eq. (2-46) we would get dx'/dt' = 0, contradicting the initial assumption dx'/dt' = -v!

What? dx'/dt' is the speed of frame S relative to frame S'. This means frame S' can never know the speed of frame S relative itself. The reason is, under the assumption of constant light speed, when photon is used to measure the speed of an inertia reference, the result is always zero!.

Similarly. do derivative operation to both sides of Eq. (2-14), and use dx'/dt' = -v (dx'/dt' is the speed frame S relative to S', and is -v by the initial assumption in Fig. 2.1), we also get dv/dx = 0! By the Reciprocity Principle, this must be so.

So there is a contradiction here: according to SRT's constant light speed assumption, the two inertia reference frames S' and S, if using photon as the measuring tool, can never obain the speed of each other!

Then in the beginning, who knows the relative speed v between frames S' and S? It turns out, it's the person who derives the Lorentz Transform, that means, the writer or the reader! Then which coordinate system this third party is using? Nothing is mentioned.

Isn't it strange? In deriving an equation involving only two parties, a third party introduces a parameter whose coordinate system is unknown! This is a well-hidden logical error. This

error also leads to another fatal logical error. And we shall disclose it now.

Lorentz Transform Invalid for Three or more Reference Frames

Although errors in LT have been found previously ([D16]), the counter examples provided are a little too weak, so the RT supporters easily dodge them. Here, we formally disclose another hidden, but fatal logical error. Except this and the above logical errors, when only two party, the observer and the observed, are involved, SRT has good self-consistency, except for a few paradoxes in special cases.

According to Gödel's theorem ([B8]), there are many complete systems, by logic reasoning, we cannot prove them true, nor false, but can only rely on experiences to examine. As for SRT, even only two parties are involved, it has very strong self-consistency, though not logically complete. The known paradoxes, including the Missile-Well paradox in particular, have shown that SRT is not logically complete.

It is because of the strong self-consistency of SRT for two parties, and the logical errors in the derivation process been hidden for over a hundred years, SRT becomes the founding stone of modern physics by pure luck. Now let's unveil this other big hidden logical error.

First, let's review the derivation process of SRT in Subsection 2.1.1. Fig. 2.1 involves only two reference frames. Now let's see what happens if three inertia reference frames are present. We add one more inertia reference frame S" to Fig. 2.1, and assume it moves in the -x direction with speed v_2, so to get Fig. 2.15.

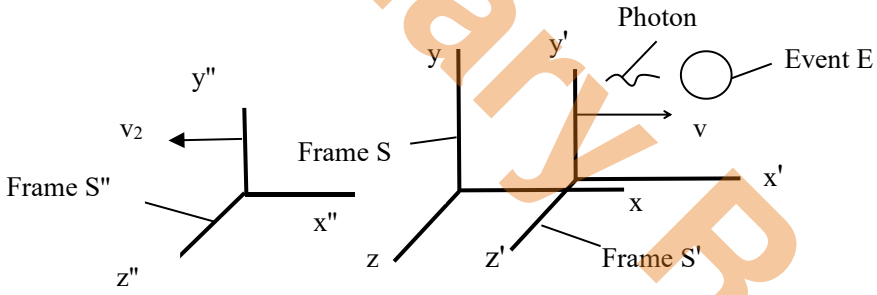

图 2.15. Relations of Coordinate Systems of Three Inertia Frames

Then we would have three sets of 1-1 pairing relations of reference frames, involving three sets of coordinate pairs denoted by S-S', S-S", S'-S". Now assume the assumptions of SRT are correct, then by the same derivations as in Subsection 2.1.1, in addition to Eq. (2-17), considering the relation between (x", t") and （x, t) as well as the relation between (x", t") and (x', t'), we would have

$$x'' = \gamma_1 (x - v_2 t), \quad t'' = \gamma_1 (t - x\, v_2/c^2) \tag{2-48}$$

$$x'' = \gamma_2 (x' - (v_{2+}v)\, t'), \quad t'' = \gamma_2 (t' - x' (v_{2+}v)/c^2) \tag{2-49}$$

wherein，

$$\gamma_1 = 1/\sqrt{1 - v_2^2/c^2}, \quad \gamma_2 = 1/\sqrt{1 - (v + v_2)^2/c^2} \tag{2-50}$$

and γ is still represented by Eq. (2-16). This is because the speed of S relative to S" is v_2, and the speed of S' relative to S" is (v_2+v).

Put Eqs. (2-17), (2-48) and (2-49) into matrix forms, we get

$$\begin{bmatrix} x' \\ t' \end{bmatrix} = \begin{bmatrix} \gamma & -v \\ -v/c^2 & \gamma \end{bmatrix} \begin{bmatrix} x \\ t \end{bmatrix} \tag{2-51}$$

$$\begin{bmatrix} x'' \\ t'' \end{bmatrix} = \begin{bmatrix} \gamma_1 & -v_2 \\ -v_2/c^2 & \gamma_1 \end{bmatrix} \begin{bmatrix} x \\ t \end{bmatrix} \tag{2-52}$$

$$\begin{bmatrix} x'' \\ t'' \end{bmatrix} = \begin{bmatrix} \gamma_2 & -(v_2+v) \\ -(v_2+v)/c^2 & \gamma_2 \end{bmatrix} \begin{bmatrix} x' \\ t' \end{bmatrix} \tag{2-53}$$

Now substitute (2-51) into (2-53), and compare (2-52) (for every possible (x", t") and (x,t)), we would get

$$\begin{bmatrix} \gamma_1 & -v_2 \\ -v_2/c^2 & \gamma_1 \end{bmatrix} = \begin{bmatrix} \gamma_2 & -(v2+v) \\ -(v2+v)/c^2 & \gamma_2 \end{bmatrix} \begin{bmatrix} \gamma & -v \\ -v/c^2 & \gamma \end{bmatrix} \tag{2-54}$$

Because v and v_2 are arbitrary, Eq. (2-54) must hold for any possible v and v_2. This is obviously impossible!

What does this mean? It means, **if SRT is correct, then no inertia reference frame can use a fixed, common clock to measure the times of two different inertia reference frames**. For example, on Earth, we need to use one clock to measure Moon, and another to measure Sun. In unpleasant words, it's like measuring man with man's clock, and measuring ghost with ghost's clock. What kind of theory it is?!

In the above we have proven, even if the basic assumptions of SRT are correct, because of a hidden error in the derivation process of the Lorentz Transform (with the inclusion of speed v measured from a third party), LT does not apply to the real world at all in which there are infinite objects moving independently. And the "Missile-Well" paradox also proves that even in the case of only two inertia reference frames, LT is also self-contradicting. Moreover, there are two assumptions in SRT are invalid.

Precisely because SRT adjusts clocks at will according to observers, it has wide adaptivity to different scenarios, so that until this date, nobody has found its fundamental errors. The reason that it has been widely applied to quantum mechanics, particle physics, quantum field theory, astrophysics, and cosmology without being proven faulty, is because **many of the related research topics involve only two parties (the observer and the observed)**.

2.3.4. Two Invalid Assumptions in SRT

Except the two hidden but fatal logic errors in deriving LT, SRT also has two basic assumptions invalid.

Constant Light Speed Assumption Is Invalid

One of the basic assumptions of SRT is that, the speed of light is constant with respect to any inertia object. This is very strange, because it seems photon can automatically adjust its

speed according to different objects. We now examine this assumption.

First, let's take a look of Fig. 2.16. Assume two objects A and B, with B static and A flying to the right with speed 0.8c. When A is c·0.2s (s represents second) to the left of the B, a light source at a distance of c·1s to the left of A emits two photons a and b of speed c to the right. Then, is A hit first by photon a or B hit first by photon b?

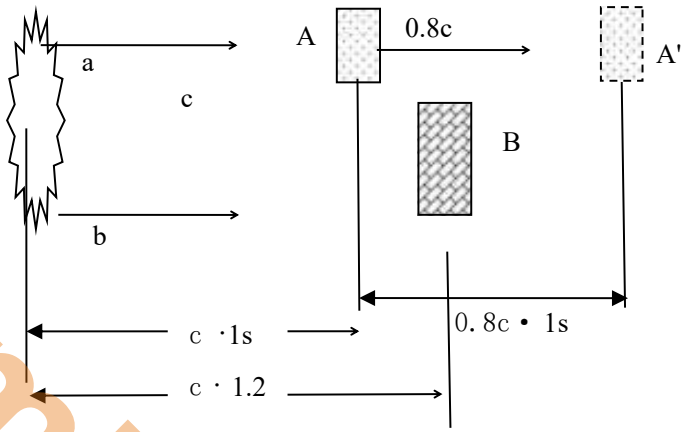

图 2.16. Light Speed Depends on Observer's Motion

Because the photons emitted do not know whom they are going to hit and what speed it is, and there is no controller to control the speed of the photon, at any fixed time, the photons must have a fixed horizontal position. If photon's speed is irrelevant to the speed of any inertia reference frame, then when the photons are emitted, a is closer to A, therefore, it will reach A first. But in reality, from a view point of B, it takes 1 second for a to reach A, and in this 1 second time, A is already on position A' at the right side of B. So, for photon a to reach A', it has to reach B first. Therefore, photo b must hit B first.

Here, we do not use relative clocks, but the ordering of events (photon hits A or B in the two reference frames) to judge which is first. This way, the "relativity of simultaneity" argument, which has fooled almost everyone, is avoided. In Subsection 2.2.3 we have proven, the concept of relative clock in SRT is deceptive. Now, using the ordering of events to make judgment, even from the view point of A, still B is hit first.

This proves:

Proposition 2.1. Light speed depends on the velocity of observer.

Then does light speed depend also on the speed of the emitter? The precise anwer to this question is complicated, and we shall discuss it when we propose a new theory about photon.

Assumption of Relativvity of Time Is Invalid

Another important assumption of SRT is, time is relative. That's the foundation for deriving the Lorentz Transform, as well as the basis of "Relativity of Simultaneity" argument often used in SRT. We now prove, in a localized environemt, even though there are many independently moving objects, still they can all use a common clock.

Not to mention others, just to see the clocking system on Earth. The earliest time system that standardized the time on Earth is the Greenwich Time. Everywhere in the world, would adjust its clock with Greenwich time every once for a while, so that a uniform time (except the fixed time difference) is obtained. Today, our networking time, mobile phone time, are all synchronized, and the errors between devices are limited to samll degree. If more accurate synchronization is needed, one needs only to take care of the distance to the master clock and the signal delays of the devices in advance, then very high precision time synchronization can be achieved.

Such public common time, cannot eliminate all errors, but the errors can be within acceptance degree for most applications. Frequent correction can restrict time error to a small value, and prevent it to accumulate as time goes on. On the contrary, the error between the two reference frames caused by time dillation in Lorentz Transform accumulates when measurement gets longer (see Subsection 2.1.1).

For those separated far away and still need common clocks, like those in airplanes and satellites, many clocks on the ground can be pre-synchronized, and through frequent correction with the base clocks on the ground, or a priori time difference rectification, synchronized clock can still be achieved.

That is to say, time synchronization can be achieved through (a priori) correction. For example, when a train enters the station, it can synchronize with the station, and because the station is fixed, it is always synchronized with the master clock.

One of the basic assumption of SRT is that two inertia reference frames with relative motion can never achieve time synchronization. This assumption has long been broken by human practice. Now that we can use technical means to achieve synchronization and correction of time and constantly eliminate error accumulation, it proves that relativity of time is not an unsurpassable law imposed on us by God.

If in the derivation of Lorentz Transform, we request both reference frames to use a common clock, then the assumption about relative time is no longer valid. Then LT becomes Gallileo Transform. The fallacy of relative time looks so absurd when we later give time a deeper philosophical definition .

Not only on time, on length, SRT also made similar mistake.

2.4. Discussion

In the above, from four grounds we invalidated the relativity theory which has ruled modern physics for over a hundred years. Because quantum mechanics, quantum field theory, particle physics, astrophysics, cosmology, and almost all modern physics, are all built on the foundation of RT, this means, the whole modern physics need to be rebuilt from the foundation level. For example, if RT does not hold, then the Particle Energy Equation (2-25) will not hold.

That means the Klein-Gordon Equation and Dirac Equation based on this Energy Equation also cannot hold, leading to the complete collapse of the whole particle physics and quantum field theory.

Physics is the foundation of all other sciences. The collapse of modern physics means many other sciences also need new grooming. Not only so, though relativity theory is born under the influence of Mach's relativistic philosophic views, in turn, it has dramatically changed the philosophies of the world, and deeply penetrated all types of social sciences, especially politics.

As such, almost all studies need to refresh their faces. It takes only a few pages to overthrow a theory (though it took 100 years), to build a new, correct theory, it may take another 100 years. In later chapters, we shall examine the basic problems that modern physics could not solve, and hope to inspire the younger generations. If RT does not hold, then many things return to Newtonian Physics. However, Newtonian Physics cannot solve many problems of modern physics. This means, a new physics revolution is waving its hands to us.

Chapter Summary: This chapter proves, from four grounds, that both General Relativity Theory and Special Relativity Theory are not valid. Because many previous researchers have done careful and dilligent research work, especially many time-consuming experiments and observations, it is painful to invalidate most of their work in a single stroke. But this is science.