Collision Confusion...an ALFA surprise

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Abstract

Application of Newton's laws to elastic collisions in different inertial frames produces disturbing violations of the revered laws of physics known as the conservation laws of momentum and energy. The analysis that follows will illustrate the problem – ignored by physics academia – but obvious to those with open and rational minds.

We intend to repeat classical collision theory in the reference frame of the laboratory - the ECEF as known by NASA – the same frame in which Galileo, Newton and subsequent experimentalists derived the primitive laws of motion and established the foundations of dynamics. Then the motion solution in the relative frame of motion will be considered... wherein lies the surprise. The findings are not surprising for adherents to the ALFA model of reality, one of whose key premises is the Earth as fixed and immovable. Yes, the geocentric Earth, revealing itself humbly in the simplest of motion – the laws governing particle collisions.

As usual, the epistemology is based on the scientific method and philo-realism.

Only read on....if you dare to have your paradigms paralyzed.

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Elastic collision in the lab frame

BC: ①➔v ②at rest AC: ①➔v_1 ②➔v_2

Lab frame

In the lab reference frame ball1 with speed v hits stationary ball2 center–to–center, ensuring one dimensional motion. After collision m_1 moves with v_1 and m_2 with v_2. There is no ball rotation nor loss of energy in other forms during the collision; only kinetic energy is transferred in the collision.

Conservation of total momentum P: $m_1v + 0 = m_1 v_1 + m_2v_2$

Conservation of total energy E: $m_1v^2/2 = m_1v_1^2/2 + m_2v_2^2/2$

These are two equations in two unknowns, with solution

$v_1 = (m_1-m_2)v/(m_1+m_2) = \Delta m^*v/M$ $v_2 = 2m_1v/M$

When $m_1 = m_2$, then $v_1=0$ and $v_2 =v$, which is the Newton's Cradle solution.
This result has been well tested for different values of m_1 and m_2; its prediction in the lab frame – based on the laws of dynamics – is not questioned. The total energy measured after collision(AC) is the same as before collision(BC). The total momentum measured AC is the same as BC.
Nothing new here...but this is where mainstream analysis stops. Covariance is invoked to project this prediction of physical laws of motion onto all inertial frames related to this lab frame. An imprudent projection of inertial equivalence – as will be seen.

Elastic collision in the <u>non-lab</u> frame

<u>The same collision will be analyzed in the inertial system moving with ball1.</u>
The motion as predicted and tested using ball 1 as reference frame just applies relative motion to the example. Ball1 is now the rest frame and ball2 is moving towards ball1 with –v...that is, to the left. This is simply the kinematic law of relative motion...

$$\mathbf{V_{1,2} = -V_{2,1}}$$

BC: ①at rest v←② AC: ①➔ v_1 ②➔v_2

<u>Non-Lab</u> frame

Note that this frame moving relative to the lab frame is equivalent to adding –v to the initial conditions in the lab frame. This allows the predicted motion in this non-lab frame to be asserted:

v_1 (NL) = v_1 (Lab) – v = $\Delta m^*v/M$ – v = - v_1 (Lab)
v_2(NL) = v_2(Lab) – v = $2m_1v/M$ – v = -v_2(Lab)

Since the law of relative motion is kinematic, it admits of no exception. But the conservation of P and E are laws of dynamics and frame-dependent in the ALFA model ....and reality!
The table below compares the initial (and thus total) E and P in the Lab and NLab reference frames.

Frame > Conservation	Lab	Non-Lab
P	m_1v	m_2v
E	$m_1v^2/2$	$m_2v^2/2$

Conservation laws in relative frames

Simply switching the reference frame – the location of measurements – apparently causes a change in Energy and Momentum of the system!

But there's no objective or intrinsic change in the physical configuration...the same reality is observed from two relative perspectives. If m_2 were twice m_1, then P2 and E2 would be twice P1 and E1.

P2 = 2P1 E2 = 2E1 !!

Is this the answer to the energy shortage? Just shift the observer??
Perhaps the collisions in horizontal inertial frames is too specific. Let's extend the scope to vertical non-inertial frames.

Free fall motion before ground impact
A mass dropped from a height will be dynamically analyzed in the lab frame, and then from the free falling reference frame. For objects falling at v near the ground, gravity's potential energy can be approximated as *mgh*.

Lab frame**:**	BC	P = -mv	$E = mv^2/2 - mgh$
Free Fall frame:	BC	P = Mv	$E = Mv^2/2 + Mgh$

M is the Earth's mass, ~6 * 10^{24} kg. If P and E are recorded in the lab frame when h > 0, the data will confirm the values predicted for E and P.
In the free fall/non-lab frame the Earth is measured falling up, with values of E and P 6,000,000,000,000,000,000,000,000 times larger than a 1 kg falling object.... This has never been observed, and again refutes the commonly-held notion of covariance. Tests like this confirm frame dependence; the lab/Earth must be taken as at rest, if the world is truly to be rationally understood.

For Newton's Bucket the Earth's lack of motion explains why the bucket reference frame does not predict the water vortex; the laws of dynamics only apply in the lab frame. But a linear version of Newton's 2nd law is easier to grasp.

Bennett's Hitchhiker

Lab frame
A car accelerates north at *a* past a hiker on the road. The hiker uses *a* and $F=m_da$ to predict the force F on the driver's mass m_d, and a spring balance confirms the law's truth.
Car frame
The law of relative motion (kinematics) says that the driver will measure the hiker moving south at *–a*. $F=m_d(-a)$ predicts (dynamics) an inertial force of $-m_ha$ acting south on the hiker.

Experience common to all tells us, without even measuring, that the driver will experience inertial force during acceleration, but the hiker will not (F = 0). The resolution of Newton' law failure for the driver's frame is the same as for the two examples above – the lab frame must be used for dynamic predictions.

Things to ponder:

1. This contradiction is fairly obvious – why has it escaped the purview of academic physicists up 'til now? Perhaps they are too busy to deal with such mundane diversions in basic mechanics. String theory, favoring the beauty of math over the scientific method, speculation over experimentation..... all attract professional and social interest ... and funding.

2. What frame predicts the correct measured values of E and P?
   Well, that has already been stated – the Lab frame is preferred...yes, a preferred frame of reference – in dynamics, not kinematics.

3. Why hasn't the preference for the lab frame been identified before?
   Probably because tests that refute relativity (and that's what the one above does) are interpreted so as to confirm the relativity paradigm.
   Another factor is the inability to clearly distinguish kinematics – the measurement of abstract motion – and dynamics, which predicts future motion. Einstein's 1905 paper was divided into kinematic and dynamic sections, the correct start, but the two postulates of Special Relativity destroyed its content. As seen above, relativity is valid in computing kinetic variables, but not in predicting dynamic parameters based on the Lagrangian method, like E and P. The lab is the preferred ---nay, the absolute – reference frame in dynamics.

4. Warning: the Center of Momentum(CoM) frame is possibly fraught with danger. The conservation laws are often used in the analysis of elementary particle collisions. To the extent that the collisions are totally elastic - and the laws applied in the lab frame - there's no risk of error.
   But the bane of the scientific method – Occam's Razor – often motivates conversion to the CoM frame of reference. This sacrifices accuracy for simplicity. All particle parameters derived from CoM analysis should be repeated in the lab frame for certification.

   This paper is just one of many that point to a major error in scientific history. The Michelson-Morley Test result included a possible conclusion that the Earth was fixed in a fluid aether. This geocentric option was ignored completely by the

physics world then, or else dismissed immediately, not by evidence to the contrary, but by a rigid ideology – an entrenched belief in Copernicanism.

After the Galileo affair geocentrism as a world view survived, not in the halls of science, but in the revealed truth held by the Church.

References:

ALFA Challenge

Bennett vixra archive

ALFA is an acronym for the theory using as axioms: Absolute Lab Frame & Fluid Aether. This universal model explains many of the puzzles that plague establishment physics and the contradictions they ignore.