

Newton's Cradle Disproves Einstein's Theories of Relativity

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Abstract. The counter intuitive behaviour of the Newton's Cradle is not, as is generally believed, adequately explained in the literature. In particular, two important issues are overlooked. One of these is that the elasticity of the balls arises due to the fact that the balls are made of hard material that doesn't easily deform during the collisions, when in fact we might have expected the hard material to have actually reduced the elasticity. This therefore rules out linear elasticity and Hooke's law as being the principle action, and so it is proposed that the energy waves that transfer the kinetic energy through the row of balls are based on fine-grained rotational elasticity, similar in nature to that which arises in electromagnetic radiation.

The other overlooked issue is that the kinetic energy waves that move through the metal balls immediately after a collision, move either to the right or to the left of the point of impact, or in both directions, but since energy transfer inside the balls has an absolute motion relative to the balls themselves, then whether the energy within the balls moves to the right, or to the left, or in both directions, must depend on the absolute motion of the balls. The direction of the energy transfer within the balls cannot depend on an arbitrary choice of rest frame. It therefore remains to determine the physical basis for absolute motion and kinetic energy. Only then, in terms of absolute motion, can the Newton's cradle be correctly analyzed.

Relativity

I. Einstein's special theory of relativity teaches that there is no such thing as absolute motion, and that all motion is only relative. This idea is not however borne out by the Newton's Cradle. When a single ball coming from the left collides with the row of balls, it stops dead. There is no rebound, and the ball at the far end of the row moves off to the right with the same momentum and kinetic energy that was originally possessed by the incoming ball. It is generally assumed that the end ball on the right doesn't move away from the row until a kinetic energy wave has travelled to it in a finite time, along the row from the point of impact of the incoming ball on the left.

It could also however be viewed from the perspective that the original kinetic energy resides in the row of balls, and that on impact with a single stationary ball to the left, the energy shifts along to the left from the row of balls into the single ball while vacating the rear ball on the right, hence travelling only the length of one ball. This would cause the rear ball on the right to drop

off and separate from the row. These two explanations are not equivalent and this results in a dilemma. It's a dilemma that relativists avoid, yet the energy transfer process is real, and it absolutely has to have a definite direction. That absolute direction can only be determined by one thing, and that one thing is the '*absolute motion*' of the balls themselves.

The fact that there is no rebound at the point of impact clearly refutes the idea that all motion is only relative. The Newton's Cradle is an unequivocal demonstration that absolute motion occurs, because the correctly identified direction of the energy transfer within the balls defines the absolute rest frame. Relativity cannot provide a symmetrical physical explanation for the energy transfer process according to whether we treat the single ball as originally being at rest, or the row of balls as originally being at rest. The two situations are simply not symmetrical as would be implied if we were to accept the relativistic belief that all motion is relative. The energy transfer within the balls has to move in a definite direction.

It will here be proposed that when two objects collide, the moving object transfers kinetic energy to the stationary object. If both of the colliding objects are already in motion in the same direction, the faster object transfers energy to the slower object. If both objects are already in motion in opposite directions, they both transfer energy to each other, and the two kinetic energy waves pass through each other.

Linear Elasticity

II. If we throw a football against a wall, it will bounce back again. This is due to the linear deformation which the ball incurs when it strikes the wall. Kinetic energy is converted into potential energy. The compression induces a recoil force and the potential energy converts back into kinetic energy again. If however we throw a hard metal ball at the wall, when it strikes the wall, it will simply fall to the ground. No linear deformation occurs in the case of the hard metal ball.

Rotational Elasticity

III. In a Newton's cradle, a hard metal ball in motion, on colliding with a row of stationary metal balls, passes its kinetic energy through the row, such that the kinetic energy will emerge again in another ball at the far end. There appears to be no linear deformation and the energy transfer occurs so fast that it appears to happen instantly. Furthermore, the balls only touch each other at a point, yet all

the kinetic energy appears to pass through this point without any deformation occurring at all. It is commonly believed that the energy passes through the row of stationary balls in the form of an elastic wave, but while this may well be true, it cannot possibly be an elastic wave of the linear kind that is commonly understood and analyzed using Hooke's law.

It will now be proposed that kinetic energy waves are geometrically similar to electromagnetic waves, in that they involve the propagation of fine-grained angular acceleration of the molecules, rather than the propagation of a linear deformation, and that these waves are accompanied by a net flow of pressurized fluid-like aether, the stuff of all space and matter, and which in motion accounts for the linear momentum [1]. This pressurized aether passes through the small contact points between the neighbouring balls in the Newton's Cradle, by virtue of the spherical shape of the balls concentrating the flow as like in a vortex cannon.

Kinetic Energy and Centrifugal Force

IV. Centrifugal force is closely related to kinetic energy. It will be proposed here that kinetic energy is the centrifugal pressure exerted by the molecules of a moving body due to its interaction with the all pervasive luminiferous medium. This would make kinetic energy an absolute quantity, analogous on the atomic and molecular scale to magnetic energy in the luminiferous medium. In both cases we are dealing with rotating entities pressing against each other with centrifugal force while striving to dilate [2], [3], [4], and in both cases the alignment of the vortices is caused by a large scale motion such as a moving metal ball or an electric current.

The motion causes coupling with the tiny electron-positron dipolar vortices of the luminiferous medium as per Ampère's circuital law [5], and in the case of moving matter, there is a reciprocal coupling with the molecules. Hence when the incoming ball in a Newton's cradle strikes the row of stationary balls, it stops dead and its kinetic energy is propagated as a fine-grained rotational wave through the stationary balls. Hence a stationary body can have kinetic energy moving through it.

Matching

V. Linear momentum is always conserved in a collision, whereas kinetic energy is not necessarily conserved. Although linear momentum and kinetic energy are essentially a measure of the same physical effect, known in earlier times as

inertia, the difference between them in respect of conservation during a collision, is that momentum is a vector quantity whereas kinetic energy is a scalar. In the Newton's Cradle, the balls are all the same size and do not coalesce, hence the kinetic energy is divided into discrete quanta. The collisions are rotationally elastic (on the nanoscopic scale), and so no energy is lost to linear deformation waves. All collisions in a Newton's Cradle are therefore said to be *matched*, and hence kinetic energy is conserved. However, in collisions where objects are of different sizes or where objects coalesce, the kinetic energy photons don't always match the bodies that they enter, and reflection occurs. This causes stress in the material of the body hence causing deformation waves, and kinetic energy is therefore lost to heat and vibrations.

Consider a Newton's Cradle in which the balls in the stationary row were to be stuck together. The end ball on the right would be unable to lift off without pulling the others with it. The kinetic energy photon that comes from the single ball on the left will then partially reflect, and the material will stretch at the point of reflection. Hence both a rotational kinetic energy wave and also a linear deformation (stretch) wave will move backwards to the left through the row of balls. The rotational wave moves faster than the linear wave, and so the reflected kinetic energy photon returns to the front of the row again, causing the first ball on the left to recoil. The recoil will occur before the row of balls is pulled away to the right, because the kinetic energy wave will reach the first ball in the row on the left before the stretch wave does. Kinetic energy in this case is lost to internal vibrations, and the collision is said to be *not matched*.

Momentum

VI. It will here be proposed that linear momentum is a product of uniformly aligned fine-grained angular momentum inherent in the molecules of a body. This fine-grained angular momentum, just as in the case of kinetic energy, arises as a result of interaction between the molecules of the body and the background luminiferous medium which pervades all of space including the interstitial regions between the molecules. This angular momentum is induced either convectively, in line with Ampère's circuital law and a compound centrifugal force, when a body is caused to move through the luminiferous medium, or inductively by a fine-grained rotational wave that is transmitted into a body when another body collides into it. In the latter case if the receiving body is free to move, the induced fine-grained angular momentum will interact with the background luminiferous medium like a friction motor, and drive the body through the luminiferous medium.

Conservation of angular momentum is closely related to conservation of energy, and in fact kinetic energy is to all intents and purposes the same thing as

fine-grained angular momentum, apart from the fact that one is a scalar quantity while the other is a vector quantity. The law of conservation of angular momentum is a fundamental law, and it is one of Kepler's laws of planetary motion.

The Electric Transmission Line

VII. The energy pulses that propagate along the space between the two wires of an electric transmission line behave in a similar fashion to the kinetic energy photons that travel through a row of balls in a Newton's Cradle [6]. The transmission line wave is a rotational wave too, but not a fine-grained rotational wave as like in the case of electromagnetic radiation or the Newton's cradle. In the case of the transmission line, the energy pulses that travel in the space between the two wires have a perimeter aethereal circulation on the large scale, and so collisions between two such pulses involve a dynamic application of Kirchhoff's circuit laws, where one closed circulation can move through another closed circulation by virtue of utilizing the dielectric space as a shunt and a means of temporarily storing potential energy in the form of linear polarization. The transmission line wave is in fact a kind of hybrid wave that involves a propagating zone of linear displacement surrounded by a closed circulation of free electricity.

Electric current that is transmitted through the Earth, with the Earth acting as a conductor, while using the adjacent atmosphere as a dielectric, operates on the same principle as the transmission line. This kind of radiation is not electromagnetic radiation, and contrary to what Kirchhoff claimed in 1857, these signals cannot be connected with the speed of light. Kirchhoff's error lay in the fact that he wrongly used the Weber constant in a manner so as to place all the elasticity inside the conducting wire, when in fact the electromagnetic constants apply to the dielectric space beyond the wire.

Rotational Waves

VIII. Jon Depew's "*Equilibrium Grid*" [8] provides an excellent basis upon which to demonstrate the rotational wave on the large scale. In one of his videos he shows how when a bar magnet is angularly accelerated that this will induce an angular acceleration in a neighbouring bar magnet. We can consider the situation in general in three dimensions simply by placing many layers of equilibrium grids on top of each other. Bar magnets with holes in the centre can

be stacked loosely over a wooden pole and spaced out from each other in the vertical plane at different heights by attaching ring notches to the pole. When the bar magnets are set rotating in the horizontal plane about the wooden pole, with their magnetic poles aligned with their vertical neighbours north-south-north-south-north- - - - - in a double helix, we will have a three dimensional equilibrium grid, and an analogue of the magnetic field in terms of itself. When a torque is applied to a rotating bar magnet within the three dimensional grid, in any direction, whether to cause a forced precession or an angular acceleration, the effect will propagate through the grid. This is a demonstration of a rotational wave where no linear displacement is involved.

In the case of electromagnetic radiation, the speed of the rotational waves is the well known speed of light. In the case of the Newton's Cradle, the speed of the rotational waves is whatever it is measured to be.

Conclusion

IX. The Newton's Cradle is explained on the basis that motion is absolute and not relative, and that kinetic energy waves are not deformation waves. Kinetic energy is derived from fine-grained centrifugal force at molecular level, and kinetic energy waves constitute a propagation of angular acceleration through the molecules. Kinetic energy is hence an absolute quantity which is induced either convectively by motion through the luminiferous medium, or inductively by kinetic energy waves which, like a friction engine, can then cause motion in a free object. Kinetic energy is therefore similar in principle to magnetic energy in the luminiferous medium, while kinetic energy waves are similar in principle to electromagnetic radiation.

References

[1] Lodge, Sir Oliver, "*Ether (in physics)*", Encyclopaedia Britannica, Fourteenth Edition, Volume 8, Pages 751-755, (1937)

(in relation to the speed of light)

"The most probable surmise or guess at present is that the ether is a perfectly incompressible continuous fluid, in a state of fine-grained vortex motion, circulating with that same enormous speed. For it has been partly, though as yet incompletely, shown that such a vortex fluid would transmit waves of the same general nature as light waves— i.e., periodic disturbances across the line of propagation—and would transmit them at a rate of the same order of magnitude as the vortex or circulation speed"

[2] Clerk-Maxwell, J., ***“On Physical Lines of Force”***, Philosophical Magazine, Volume XXI, Fourth Series, London, (1861)
http://vacuum-physics.com/Maxwell/maxwell_oplf.pdf

[3] O’Neill, John J., ***“PRODIGAL GENIUS, Biography of Nikola Tesla”***, Long Island, New York, 15th July 1944, quoting Tesla,
“Long ago he (mankind) recognized that all perceptible matter comes from a primary substance, of a tenuity beyond conception and filling all space - the Akasha or luminiferous ether - which is acted upon by the life-giving Prana or creative force, calling into existence, in never ending cycles, all things and phenomena. The primary substance, thrown into infinitesimal whirls of prodigious velocity, becomes gross matter; the force subsiding, the motion ceases and matter disappears, reverting to the primary substance”.
<http://www.rastko.rs/istorija/tesla/oniell-tesla.html>

[4] Whittaker, E.T., ***“A History of the Theories of Aether and Electricity”***, Chapter 4, pages 100-102, (1910)
“All space, according to the younger Bernoulli, is permeated by a fluid aether, containing an immense number of excessively small whirlpools. The elasticity which the aether appears to possess, and in virtue of which it is able to transmit vibrations, is really due to the presence of these whirlpools; for, owing to centrifugal force, each whirlpool is continually striving to dilate, and so presses against the neighbouring whirlpools.”

[5] Tombe, F.D., ***“The Double Helix Theory of the Magnetic Field”*** (2006)
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<http://www.wbabin.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/252>

[6] Tombe, F.D., ***“Newton’s Cradle and the Transmission Line”*** (2012)
<http://gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/4104>

[7] Kirchhoff, G., ***“On the motion of electricity in wires”***, Philosophical Magazine, Volume XIII, pp. 393-412, (1857)
[http://www.ifi.unicamp.br/~assis/Apeiron-V19-p19-25\(1994\).pdf](http://www.ifi.unicamp.br/~assis/Apeiron-V19-p19-25(1994).pdf)

[8] Depew, Jon, ***“The Equilibrius Grid”***
<http://www.youtube.com/watch?v=xeeiqnFA1hU>