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Article II: The Equality of Rest and Uniform Motion

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Purpose

In the following article, I will compare the state of an object observed at rest with the state of an identical object observed in uniform (straight-line) motion to decide whether these are one and the same state or two distinctly different states.

Article II

It seems natural for an observer to recognize the inactive state of motion of an object that is observed to be at rest. But have you noticed how often an object observed in the state of uniform (straight-line) motion (or nearly so) is referred to as having the same characteristics as the object observed to be at rest? In the science of physics, "statics" is the study of the forces affecting nonmoving objects while "dynamics" is the study of the forces affecting moving objects. This means that the object observed at rest is a static object while the object observed in uniform motion is a dynamic object. Also the static resting object is said to have a zero kinetic energy rating and a zero momentum rating. Not so for the dynamic moving object with its professed positive kinetic energy rating and positive momentum rating. So why is it, with these considerably different kinetic energy and momentum ratings, are the resting object and the uniformly moving object often referred to as having the same characteristics?

(2) A good and commonly recognized example of this is in Newton's LAW I where he refers to how both a body in the state of rest and a body in the state of uniform motion will continue in that state "unless it is compelled to change that state by forces impressed upon it."[1&2] According to the formula acceleration = Force / mass, the change in the motion of the static resting object will be identical to the change in the motion of the dynamic uniformly moving object, given that each object is identical to the other and subjected to the same magnitude of accelerative force for the same period of time in the same frictional environment. Yet this prediction of Newton's seems in conflict with our static and dynamic view of objects. For if the static state of a resting object is quite different from the dynamic state of a uniformly moving object, and if, for the moment, we grant reality to the considerable difference in their professed levels of "kinetic energy" and "momentum", then surely the acceleration experienced by each will also be quite different given the same force and duration. But, in reality, such is not the case. The effect of a given accelerative force upon a given object produces the same predictable rate of acceleration regardless of whether the object is observed to be statically at rest or dynamically in uniform motion at any velocity, prior to the impression of the acceleration/Action force.

(3) (Objectors may make the claim that this is not true of particles traveling in accelerators. But I think a valid objection to such a claim is that there exists no proof that the expanding magnetic

energy fields that cause the particle's acceleration remain as forceful at high relative particle velocities as they are at lower relative particle velocities.)

(4) Yet if static objects observed to be at rest behave exactly the same as dynamic objects observed to be in uniform motion, then why is it that we think of them as being somehow different? Perhaps the problem is with the observer. Consider this example. If you are wearing a space suit and located in deep space well beyond this solar system and you position a #6 billiard ball directly in front of you, will you not immediately accept this #6 ball as being at rest? Then if a helper some distance away throws a #12 billiard ball so that it passes by directly in front of you at a close, but safe, distance, will you not immediately accept that this #12 ball is in uniform motion on its way by? Yet if you fire up your jet rocket pack and catch up to, and then slow to match the uniform motion of, billiard ball #12, will you not now observe ball #12, motionless before you, as being the ball that is statically at rest? In fact, from your new perspective, will you not also observe the previously static #6 ball that you left behind as now in possession of a dynamic motion of its own? Nothing has changed for the #6 ball, or after the toss, for the #12 ball yet from your first perspective, the #6 ball is static and the #12 ball is dynamic, while from your second perspective, the opposite is true for each ball.

(5) At this point you realize that the difference between an object observed statically at rest and the same object observed dynamically in uniform motion is nothing more than a difference in the opinions of different observers. You now recognize that there is a natural tendency for all non-accelerating observers to think of themselves as being at rest, regardless of the magnitude of the velocity they are thought to possess. This means that for the object under study, rest and uniform motion are the same state. Rest = uniform motion = rest. Also since velocity refers to a straight-line, constant-speed, constant-direction motion between non-accelerating point A and non-accelerating point B, with points A and B remaining a fixed distance apart for the duration of the event, then velocity = uniform motion = rest = uniform motion = velocity. They are all the same inactive state for the participating object.

(6) (Please note that "uniform" means "unchanging" and since acceleration represents change, then logically it is improper to make reference to a steady rate of acceleration as "uniform acceleration". This misuse of terms is an oxymoron meaning "unchanging change". Its use needs to be discontinued. Thus "uniform motion" needs no added qualifier such as "straight-line" for the only uniform motion possible is unchanging motion in a straight-line or as Newton termed it, a "right-line".)

(7) Now with rest being the same state as uniform motion, then uniform motion must be as inactive a state as rest as far as the object is concerned. Let us join these two observed states together with a common term. I hereby coin the term "rest-motion" to refer to the inactive, non-accelerative default state of such an object.

(8) Key to understanding rest-motion is recognizing the absolute nature of this inactive state for an object. The inactive state for an object in rest-motion is identical to the inactive state for the same object in every other state of rest-motion given the absence of acceleration-causing action forces. This means that there is no preferred apparent velocity of rest-motion. A non-rotating

object traveling through deep space at one observed velocity of rest-motion is in an inactive state identical in every way to the inactive state of the same non-rotating object traveling through the same space at any other observed velocity of rest-motion. No matter how different these two velocities of rest-motion are made to appear to the observer, the object in one such state of rest-motion is no more or no less inactive than the same object in the other state of rest-motion. Thus the inactive nature of an object in rest-motion is absolute or unchanging from one velocity of rest-motion to any other velocity of rest-motion.

(9) A logical proof of the equality of the inactive state of an object's rest-motion at one observed velocity compared to the inactive state of the same object's rest-motion when observed at quite a different velocity is as follows: After placing, by spacecraft, an object in deep space, far from the center of this solar system, the pilot observes the stationary object about 1000' beyond the craft's view port. The object's velocity of rest-motion, relative to the spacecraft, is 0 mph with a constant bearing. Next, after firing its rocket motors for one minute, the spacecraft takes on a new velocity of rest-motion that results in an ever-increasing gap opening up between the spacecraft and the object. After 24 hours, the gap between the spacecraft and the object has grown to thousands of miles. Next the spacecraft rotates about and once directed toward the distant object, powers up its rockets long enough to change the spacecraft's velocity of rest-motion at which it is closing upon the object's location by 50,000 mph. Now with its rockets once again silent, the gap between the inactive object in rest-motion at one velocity and the inactive spacecraft in rest-motion at quite a different velocity is rapidly shrinking. Yet the pilot's rest-motion is so complete that all of her senses verify that she is every bit as much at rest or inactive as when a day earlier, while in possession of the completely different velocity of rest-motion possessed when she originally placed the object in deep space. As the object rapidly approaches, the pilot innately decides that the object's observed motion belongs solely to the object. Yet her logic requires that she recognize that since her departure from the object, all acceleration has occurred to the spacecraft and none of significance to the object. Thus as she observes the object flash past the craft's view port in apparent possession of a closing velocity of 50,000 mph, she understands that while her two perspectives of the object are quite different, since nothing has happened to the object from the time of her departure to the time of her high-speed arrival, there is no logical reason for her to decide that the object's inactive state of rest-motion is any way effected by the velocity of her rest-motion at the time of her second observation. She now realizes that it would make no difference if she were to accelerate the spacecraft from a greater distance to pass the object at a greater speed. She understands that she would feel equally inactive and at rest and the object would be equally inactive and unchanged by her new higher closing velocity of rest-motion during the observation. Whether one attributes the velocity of rest-motion to the observer, or to the observed, the end result is the same. There is no preferred velocity of rest-motion. Thus no observation of an object's inactive state of rest-motion can, in any way, change that inactive state into a state that is any more or any less inactive.

(10) While the absolute concept of rest-motion is core to the new science of Universal Physics, understand that rest-motion is nothing more original than a restatement and extension of Galileo Galilei's Principle of Relative Motion. Four centuries ago, Galileo taught us that mechanical experiments performed within a nearly non-accelerating frame of reference inside the hold of a

ship at dock were identical in every way to the same mechanical experiments when performed inside the ship's hold while the ship was underway at full speed through smooth waters.

(11) Next one may wonder what has to happen to an inactive object in rest-motion to cause it to become active? Acceleration is the answer. If an acceleration/Action force (Newton's LAW I) is impressed upon the object, the object will immediately experience a change in its speed, direction, rate of rotation, or as many as all three at once. An accelerating object is an active object. An object in rest-motion is an inactive object. Therefore, rest-motion is the opposite of acceleration which, conversely, is the opposite of rest-motion.

(12) As you ponder this information while enjoying the nearly inactive state of being seated at your desk, consider that you are in possession, at any given moment, of a nearly complete rest-motion of at least 60,000+ miles each hour in your Earthly orbit of the Sun. So what do you think is the perfect velocity of rest? Is it 60,000+ mph? 0 mph? 600,000,000 mph? Employing the concept of rest-motion, we now know the answer to be that you will feel equally at rest or inactive at any achievable velocity of rest-motion.

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References

[1] Sir Isaac Newton, 1686, 1729, Mathematical Principles of Natural Philosophy and His System of the World, 1934, 1962, PRINCIPIA, University of California Press, Berkeley, Los Angeles, London, page 2 - 13.
[2] Newton's LAW I: Every body continues in its state of rest, or of uniform motion in a right line, unless it is compelled to change that state by forces impressed upon it.

Author's Commentary

Now that we have added the new concept of rest-motion to our Force Investigation Toolbox, the need for imaginary "inertia" is fading.

Are you wondering about the reality of kinetic energy and momentum as well? After all, if an object can be switched from static rest to dynamic motion, using the old separate terms for rest-motion, based solely upon changes in the opinion of a non-impartial observer, then the object's "kinetic energy" and "momentum" must switch as well. This means that when a thousand observers, each in possession of a different rest-motion, are observing a single object, they will assign to that object a thousand different "kinetic energies" and a thousand different "momentums". Clearly if they are real, the single object cannot be in simultaneous possession of more that one magnitude of "kinetic energy" or one magnitude of "momentum". In reality, the object is in possession of none of either. "Kinetic energy" and "momentum", which are frame-related rating systems we made up to determine, ahead of time, the effects of a collision between two objects, are nothing more real than that, frame-related rating systems. They are the result of the practice of homocentric Physics whereby the non-accelerating non-impartial observer first determines himself or herself to be at rest and then assigns these imaginary rating systems to all objects that do not share in the observer's particular state of rest-motion. One of the consequences of understanding of the concept of rest-motion is that the notion that somehow the imaginary rating system of a high-speed object's "kinetic energy" becomes real and spills over to cause an increase in the object's quantity of matter (mass) is, in reality, a non-event.

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