ISM Energy and Momentum

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Energy and Momentum are related entities that are closely linked with the speed of light. For a photon – traveling at c – the value for energy and momentum are identical. As an object slows, momentum and energy begin to diverge and are related by the ISM orientation value (X) times the velocity of the object. ISM coordinates provide an interesting and new interpretation regarding the relationship between energy and momentum

Using IWPD Scale Metrics (ISM), all energy – regardless of form – can be related back to the kinetic energy of the component energimes of a system, which are manifested through the constant speed of the energime (which is c). It is interesting to note that for a photon, 100 % of the component energimes are moving along the axis-of-motion and its energy is expressed as:

$$E = mc^2$$

For objects moving at "non-relativistic" speeds the orientation value (X) of energimes along the axis-of-motion approaches 50% in both the positive and negative direction. Kinetic energy for objects with speeds << c becomes:

$$E = 1/2mv^2$$

This suggests a general form of the equation as:

$$E = Xmv^2$$

where (X) represents the position of an object within the overall "time segment" of the ISM coordinate system, which can also be described as the fraction of component energimes oriented in a positive direction along the axis-of-motion. (X) has a range of values between 0.5 and 1.0. It stands to reason that the orientation of the transferred energimes is governed by the average velocity of the transferred energimes along the axis-of-motion. That is, in order to successfully transfer, a component energime must be moving with a velocity along the axis-of-motion that is at least as great as the velocity of the particle that will be receiving it, and can be moving with a velocity no greater than the speed of light.

Therefore, the fraction of component energimes moving in a positive direction along the axis-of-motion is equivalent to the average velocity of transferred energimes and can be expressed as:

$$X = \frac{V_{particle} + 1}{2}$$

Solving for the velocity of the particle motion only yields:

$$V_p = 2X - 1$$

When component energime motion is analyzed along the axis-of-motion the particle velocity becomes obvious.

If half the energimes are moving in the positive direction and half are oriented in the negative direction along the axis-of-motion, the net result is the object will be moving with a velocity of (2)(.5) – 1; or, the object will be at rest.

← 0.5 → 0.5 Object at-rest

Fraction of component energimes moving in (+) and (-) direction along axis-of-motion

If 60% of the energimes are moving in the positive direction along the axis-of-motion and 40% are moving in the negative direction, the overall velocity of the particle will be (2)(.6) – 1 or a net velocity of 0.2c

← 0.4 → 0.6 Object with net particle velocity of 0.2c

Fraction of component energimes moving in (+) and (-) direction along axis-of-motion

Therefore, the velocity of a particle originally at rest can be determined by:

$$V_p = \frac{(X)(Mass_{transferred})}{Mass_{total}}$$

We now have a way to determine the momentum of the transferred energimes in a collision.

$$(X)(M_{transferred}) = (V_{particle})(M_{total})$$

This equation suggests a new way to look at momentum. Realizing that (X) represents an average velocity, the overall concept of momentum remains a product of mass and velocity; however, this is equivalent to suggesting that momentum is a measure of the orientation of the energimes transferred.

We already determined that energy was equivalent to the number of energimes transferred. We now see that momentum is a function of the orientation of those same transferred energimes.

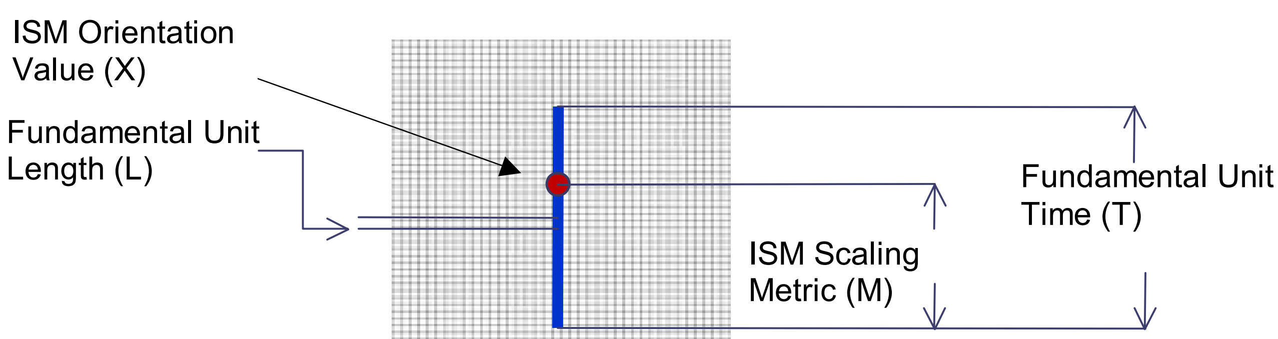
$$Energy = M_{transferred}$$

$$Momentum = (X)(M_{transferred})$$

We now see how the actual value of the momentum of transferred energy can change depending on the object that absorbs the energy. That is, an object with significant rest mass is not going to be moving as fast upon the absorption of energy as an object with less rest mass. This will decrease the value of (X) and actually decrease the value of the momentum associated with the transferred energy. On the other hand, if the absorbing entity has no rest mass, the value of X will be 1 and the energy and momentum will be identical.

However, this still does not address the full issue. Even if (X) were equal to 1 in a collision between particles (which it is not), there would be insufficient momentum contained in the transferred energy from a collision to account for the momentum of the object after it absorbs the energy.

To address this requires the use of a Scaling Factor that takes into account the ISM Fundamental Unit Time and the Fundamental Unit Length. It is the Scaling Metric that allows ISM to explore the relationship between energy and momentum using only three spatial dimensions as opposed to an analysis of 4-Velocity with 4-Momentum.



Scaling Factor = M/L

By applying the Scaling Factor to both the V_p and Momentum provides results in agreement with observation and provides additional observational support for the use of ISM coordinates and the potential benefits of describing 4 dimensions as 4 – 1.