On Relativity, Quantisation, Symmetry and Perspective

(Perspective: the fourth Principle)

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Abstract

A reflection on the difference between translation and rotation shows the symmetry between the Relativity Theory and the Quantum Theory. The reflection is realistic, not scientific.

There is a relation between the seemingly inapplicable Violation of Bell's Inequalities and the impossibility to quantize gravity. That relation is: perspective. We project orbital movements to vibrations and smear them over time to waves until the picture tallies. In the mean while we jump around without noticing, let alone that we take the jumps into account in our calculations. We see gravity as an effect of rotation symmetry breaking but in fact it is an effect of translation symmetry breaking. It is a matter of perspective. The probabilities in Bell experiments are in fact sine functions and not mere fractions as Bell saw them. It is a matter of perspective.

A symmetry is characterized as a change that leaves something unchanged. A translation and a rotation are essentially different, like a left shoe and a right shoe also are essentially different. A translation is a change of position in one and the same direction and a rotation is a change of direction at one and the same position. Both are examples of a symmetry. And they are also symmetric in the sense that if 'position' and 'direction' are mutually being exchanged, then they move into each other. So translations and rotations are symmetric symmetries.

Position and direction are indeed mutually exchangeable because they are relative in respect of each other: if the position of one object is chosen to be in the origin of a coordinate system then the position of an other object can only be represented as a direction in respect of that coordinate system (3 coordinates in respect of the origin) and vice versa.

A similar relation as between translation and rotation exists between mass and spacetime: mass and spacetime are symmetric symmetries. It depends on the perspective (the choice of origin of the coordinate system) if that can be seen. Einstein looked from the right perspective: he saw mass and spacetime from a mutual movement. (That is possible in 4 dimensions).

Relativity Theory describes the Universe from translations: gravity emerges from translation symmetry breaking. Quantum Theory describes the Universe from rotations: electromagnetic and other forces emerge as rotation symmetry breakings. Therefore gravity is not quantizable, whereas the other forces are: the other forces are describable in terms of phase behaviour coming from rotations.

Because translations and rotations are symmetric, Relativity Theory and Quantum Theory also are symmetric: from the right perspective they move over in each other. This can be explained as follows.

As position and direction are mutually exchangeable in 3 dimensions, in the same way position, direction and time are inter-exchangeable in 4-dimensional spacetime. Spacetime is the world of the forces. When a force constantly works on an object in one direction then the velocity of that object will change in time, not in direction. When the same force constantly works on the same object but in a direction perpendicular on the direction of movement of that object then the velocity of that object will change in direction, not in time. So in 4-dimensional spacetime direction and time are mutually exchangeable. Besides, in 4-dimensional spacetime time can be represented as position so that in spacetime direction, time and position are inter-exchangeable.

Both Relativity Theory and Quantum Theory give as a result a very small and beautiful little formula. In Relativity Theory this is $E = mc^2$ and in Quantum Theory this is the uncertainty relation of Heisenberg in the two shapes: $h = \Delta s \Delta p$ and $h = \Delta E \Delta t$. Considered from the right perspective all these formulas move over in each other. That perspective becomes visible if the meaning of Δ in the uncertainty relation is changed. The Δ sign in the uncertainty relations means: ‘the range of’. If this meaning is replaced by ‘the change of’ then the three formulas become identical. After all, ‘range’ in space corresponds with ‘change’ in spacetime. (Time and position are exchangeable in spacetime). The quantities in the formula $E = mc^2$ have the units: [kg m^2/s^2]. If we now apply the meaning: ‘change’ for the Δ in the uncertainty relations then Δs becomes a distance with unit: [m] and Δp (= m Δv) becomes mass multiplied by acceleration with units: [kg m/s^2]. The units of $h = \Delta s \Delta p$ then become: [kg m^2/s^2]. The change of time (Δt) in time becomes 1 (without unit) and ΔE doesn’t change (energy conservation law) so $h = \Delta E \Delta t$ becomes $h = E$. Considered this way the three formulas are identical: $h = E = mc^2$.

Both theories then are symmetric and depend on perspective: looking in the direction of the small you see Quantum Theory and looking in the direction of the tall you see Relativity Theory. Both are equivalent descriptions of the Universe.