On Relative Orbital Rotation in Relativity Theory

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Abstract

We consider the following question within both Newtonian physics and relativity theory. "Given two point particles X and Y, if Y is rotating relative to X, does it follow that X is rotating relative to Y?" As it stands the question is ambiguous. We discuss one way to make it precise and show that, on that reading at least, the answers given by the two theories are radically different. The relation of relative orbital rotation turns out to be symmetric in Newtonian physics, but not in relativity theory.

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