

## Quantum Physics

# Overview of the structural unification of quantum mechanics and relativity using the algebra of quantions

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The purpose of this contribution is to provide an introduction for a general physics audience to the recent results of Emile Grgin that unifies quantum mechanics and relativity into the same mathematical structure. This structure is the algebra of quantions, a non-division algebra that is the natural framework for electroweak theory on curved space-time. Similar with quaternions, quantions preserve the core features of associativity and complex conjugation while giving up the unnecessarily historically biased property of division. Lack of division makes possible structural unification with relativity (one cannot upgrade the linear Minkowski space to a division algebra due to null light-cone vectors) and demands an adjustment from Born's standard interpretation of the wave function in terms of probability currents. This paper is an overview to the theory of quantions, followed by discussions and conjectures.

Comments: V2: Minor footnotes expansion: 4,5; added footnote 9, minor changes in section V and V-B

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