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## Geometric Event-based relativistic quantum mechanics

*Wednesday, 25 June 2025 17:45 (15 minutes)*

We propose a special relativistic framework for quantum mechanics. It is based on introducing a Hilbert space for events. Events are taken as primitive notions (as customary in relativity), whereas quantum systems (e.g. fields and particles) are emergent in the form of joint probability amplitudes for position and time of events. Textbook relativistic quantum mechanics and quantum field theory can be recovered by dividing the event Hilbert spaces into space and time (a foliation) and then conditioning the event states onto the time part. Our theory satisfies the full Poincaré symmetry as a ‘geometric’ unitary transformation, and possesses relativistic observables for space (location of an event) and time (position in time of an event). Based on V. Giovannetti, S. Lloyd, L. Maccone, Geometric Event-Based Quantum Mechanics, New J. Phys. 25, 023027 (2023). doi:10.1088/1367-2630/acb793

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