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# The quantum group structure of quantum reference frame transformations

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Quantum gravity and quantum information both call for a generalization of reference frame transformations. In quantum gravity, quantum groups naturally implement such generalization in some noncommutative space-times. In quantum mechanics, the concept of quantum reference frame emerged when linking reference frames to quantum systems. The connection between quantum groups and quantum reference frame transformations could then provide a deeper understanding of the relation between the quantization of observers and the quantization of spacetime.

In this talk, I will present the correspondence between quantum reference frame transformations and transformations generated by a quantum deformation of the Galilei Lie group with commutative time, at first order in the quantum deformation parameter. This correspondence is made explicit once the quantum group non-commutative transformation parameters are represented on the phase space of a quantum particle, provided that the quantum deformation parameter is inversely proportional to the mass of the particle serving as the quantum reference frame.

## Working Group

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