



EINLADUNG

im Rahmen des Teilchenphysikseminars

zum Vortrag

von

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über

***„The covariance of physical laws
in quantum reference frames“***

Abstract:

Every observation in physics is made with respect to a frame of reference. In practise, we use real physical systems as reference frames, and as such they obey quantum mechanical laws. I will introduce a general method to quantise reference frame transformations, which generalises the usual reference frame transformation to a “superposition of coordinate transformations”. I will describe how states, measurements, and dynamical evolutions transform between different quantum reference frames. While entanglement and superposition will be shown to be frame-dependent features, the form of the dynamical physical laws (e.g. the Schrödinger equation) remain the same in all frames, which generalises the notion of covariance of physical laws to quantum reference frames.

I will end with two applications of our results: a definition of the rest frame for a quantum particle in a superposition of velocities, and, if time permits, with a resolution of an old problem of identifying the qubit for a relativistic spin particle.

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gez.: A. Hoang, S. Plätzer. M. Procura