

Bohr's correspondence principle for the Nelson model

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Abstract: In this talk I overview some recent works, in collaboration with Z. Ammari, on the classical limit of the Nelson model. Such a model describes non-relativistic quantum particles in interaction with a quantized scalar field. The corresponding classical dynamics is described by the Schrödinger-Klein-Gordon system of partial differential equations (with Yukawa coupling). The main object of the talk is to discuss the link between these two models, given by the classical limit. The problem becomes considerably harder if we take into account the renormalization procedure needed, at the quantum level, to describe the dynamics of the system without cut offs; nevertheless the suitable classical S-KG dynamics is still obtained, despite renormalization.