Coarse graining of quantum space time models

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Spin foams and loop quantum gravity propose a description of quantum space time by providing the dynamical rules for its microscopic building blocks. We will discuss the many particle regime of these models, in which one expects a smooth space time to appear.

To this end we will employ coarse graining and renormalization techniques, such as tensor network renormalization. After explaining how these techniques allow renormalization in background independent theories we will present explicit results on the large scale dynamics of certain (reduced) models. We will also explain fascinating connections to anyon models that have recently emerged in this work.