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Tensor network formulation of quantum gravity

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It is well known that the action for General Relativity (GR) can be rewritten in terms of a tetrad field e_μ and a spin connection ω_μ where the former is loosely a square root of the metric and the latter is a gauge field needed to ensure local Lorentz invariance. It is less well known that these two can be combined into a single gauge field associated with local (anti)de Sitter symmetry with the resultant gauge theory reducing to GR in a Higgs phase. In two dimensional Euclidean space the model appears as a novel form of $SU(2)$ gauge theory which can be reformulated as a tensor network. We describe analytic and numerical results obtained for this theory and its extension to four dimensions.

Authors: CATTERALL, simon; Dr UNMUTH-YOCKEY, Judah (Syracuse University); ASADUZZAMAN, Mo-hammad (Syracuse University)

Presenter: CATTERALL, simon

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