Quantum Fields as Cosmic Censors in 2+1-Dimensions

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There exist solutions of the classical equations of General Relativity which contain regions where 'predictability' is lost. That is the case, for example, of 'naked singularities' (i.e., space-time singularities without an event horizon) or regions inside a rotating black hole. Indeed, Penrose's Cosmic Censorship conjectures that such regions of unpredictability do not exist in Nature. In this talk I will present some recent work where we investigate the fate of such regions under quantum perturbations. Specifically, we investigate the backreaction of a quantum scalar field in two separate 2+1-dimensional, locally-anti de Sitter space-times: that of a naked singularity and that of a rotating (BTZ) black hole. In the former case, we find that the quantum field 'dresses up' the naked singularity with an event horizon; in the latter case we find that the region of unpredictability inside the black hole is unstable. These results point to the rôle of quantum physics as a Cosmic Censor.