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Field Theory Thermalization from Gravitational Collapse in String Theory MARY HEMMETER, LEOPOLDO PANDO ZAYAS, DORI REICHMANN, University of Michigan, DAVID GARFINKLE, Oakland University — Motivated by gauge/gravity correspondence, we numerically investigate gravitational collapse in 5-dimensional asymptotically AdS space-time. We consider various scalar fields: minimally coupled massless, massive and, for the first time, fields with string theoretic potential. After establishing various general aspects of collapse such as the relation between the black hole formation time and its optical approximation, we focus on the study of Choptuik scaling. Namely, we study the threshold of black hole formation and establish the universal scaling law $M_{BH} \propto |p-p^*|^\gamma$ which relates the mass of the formed black hole to a parameter p in the initial profile of the scalar field where the critical parameter p* constitutes the criterion for black hole formation ($\gamma \approx 0.41$). We aim to provide numerically accurate values for the universal factor γ and to investigate its place in the dual interpretation. Finally we address the question of the stability of AdS space with respect to black hole formation under arbitrarily small perturbations and its implication for thermalization in field theory.

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