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Instability of anti de-Sitter spacetime

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In a joint work with Piotr Bizoń, we study the nonlinear evolution of a weakly perturbed anti-de Sitter (AdS) space by solving numerically the spherically symmetric Einstein-massless-scalar field equations with a negative cosmological constant. Our results suggest that AdS spacetime is unstable against a black hole formation under arbitrarily small generic perturbations. We conjecture that this instability is triggered by a resonant mode mixing which gives rise to diffusion of energy from low to high frequencies. A partial summary of our results can be found in Phys.Rev.Lett 107 031102 [arXiv:1104.3702].