Abstract Submitted
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Exploring Stability of General Relativistic Accretion Disks[1] OLEG KOROBKIN, ERNAZAR ABDIKAMALOV, Center for Computation and Technology, Louisiana State University, ERIK SCHNETTER, Perimeter Institute, Canada, NIKOLAOS STERGIOULAS, Aristotle University of Thessaloniki, Greece, BURKHARD ZINK, University of Tuebingen, Germany — Self-gravitating relativistic disks around black holes can form as transient structures in a number of astrophysical scenarios, involving core collapse of massive stars and mergers of compact ob jects. I will present results on our recent study of the stability of such disks against runaway and non-axisymmetric instabilities, which we explore using three-dimensional hydrodynamics simulations in full general relativity. All of our models develop unstable non-axisymmetric modes on a dynamical timescale. We observe two distinct types of instabilities: the Papaloizou-Pringle and the so-called intermediate type instabilities. The development of the non-axisymmetric mode with azimuthal number $m = 1$ is accompanied by an outspiraling motion of the black hole, which significantly amplifies the growth rate of the $m = 1$ mode in some cases. We will discuss the types, growth rates and pattern speeds of the unstable modes, as well as the detectability of the gravitational waves from such objects.

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