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Gravitational instabilities and cosmic censorship

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I will review the results that we have obtained in the last few years on linear perturbations in the Kerr-Newman family. It is proved that the naked singularities arising in the super-extreme (charge or angular momentum larger than mass) cases are unstable, and that the stationary regions beyond the inner horizon of black holes are also unstable. These results have implications on cosmic censorship in both its weak and strong forms, since the inner horizon is also a Cauchy horizon for an appropriate data surface on the black hole exterior. The dynamics of gravitational perturbations in these non globally hyperbolic spacetimes can be uniquely defined in terms of data on a partial Cauchy surface thanks to the fact that there is a single choice of boundary conditions at the singularity that makes the linear scheme self consistent.
References: Class.Quant.Grav in press; ibid v. 27 (2010) 187005; ibid v. 26 (2009) 215002; ibid v.25 (2008) 2450012; ibid v. 26 (2006) 5063; Phys.Lett. B644 (2007) 289