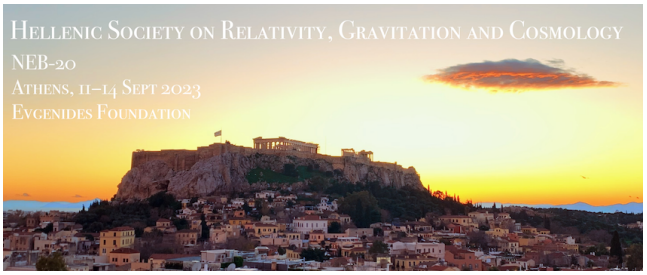

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Black holes without Cauchy horizons: the role of integrable singularities

Wednesday, 13 September 2023 17:20 (20 minutes)

Although we cannot understand the true nature of singularities in the framework of GR, it is possible to evade them by following a fairly simple strategy: generate regular BHs by filling the spacetime around the central singularity with some physically reasonable source of matter (which could be consequence of some new gravitational sector). This has produced a plethora of new regular BH solutions in recent years, mainly because the matter source used to evade the central singularity can be interpreted in terms of nonlinear electrodynamics. However, all these regular BH solutions contain a Cauchy horizon, a null hyper-surface beyond which predictability breaks down, and also leads to mass inflation at the perturbative level, a pathology which occurs even in loop quantum gravity inspired models. Even though the strong cosmic censorship conjecture establish the impossibility of extending spacetime beyond this region, in this talk we show how far we can go, without invoking this conjecture, in the building of a physically reasonable black hole without a Cauchy hyper-surface. Following this reasoning, we find a black hole lacking of Cauchy horizon, asymptotically flat and satisfying either the strong or dominant energy condition. The above is possible by demanding integrable singularity for the Ricci scalar, whose direct consequence is the appearance of finite tidal forces.

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Session Classification: Parallel Session A