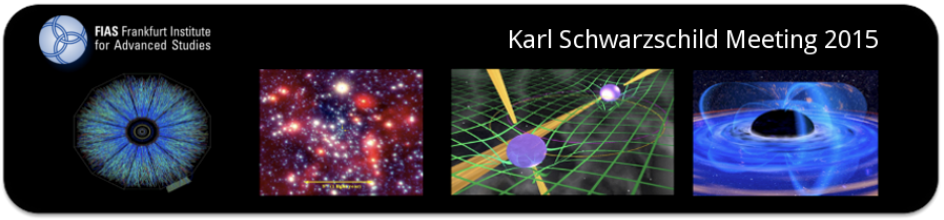

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Good properties of Schwarzschild's singularity

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Schwarzschild's solution is the soul of General Relativity (GR). It was found immediately after Einstein found his equation, and plays an essential role in the approximations that allow us to test GR in our solar system. Moreover, the most notable problems of GR, such as the occurrence of singularities and the information paradox, were found on the background provided by Schwarzschild's solution. The reason is that this solution has singularities, widely regarded as a big problem of GR. While the event horizon singularity can be removed by moving to non-singular coordinates, not the same is true about the r=0 singularity. However, I show that there are coordinates which make the metric finite and analytic at the singularity r=0 [1]. The metric becomes degenerate at r=0, so the singularity still exists, but it is of a type that can be described geometrically by referring to finite quantities only [2,3.4]. Also, the topology of the causal structure is shown to remain intact [5], and the singularities of this type are shown to be compatible with global hyperbolicity [1,6]. This suggests a possible solution to the black hole information paradox, in the framework of GR [7]. As a side effect, the Schwarzschild singularity belongs to a class of singularities accompanied by dimensional reduction effects, which are hoped to cure the infinities in perturbative Quantum Gravity [8].

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