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UNIQUE REGULAR INTERIOR SOLUTION FOR THE SLOWLY ROTATING KERR BLACK HOLE

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I will present the $NoHair$ result for the solution of Einstein equations describing the non-vacuum regular interior and the vacuum exterior of a spinning black hole. There are only two parameters characterizing the vacuum exterior and two parameters for the non-vacuum regular interior of a spinning black hole.
These two sets of two parameters are connected by the matching condition for the interior and the exterior solutions on the apparent horizon. The solution depends on two parameters for which one can choose the mass M and the angular momentum $J = Ma$ characterizing the vacuum exterior Kerr metric. The unique regular source of the Kerr gravitational field rotates rigidly with the angular velocity Ω equal to the angular velocity $\Omega_{_H}$ of the Kerr black hole horizon. The exterior vacuum solution is given by the well-known Kerr metric while the interior metric is completely new.

My result settles the problem posed by R. P. Kerr in 1963 in the case of slow rotation. This is the $NoHair$ result for the regular spinning black holes such as those indirectly observed in nature and thus it should have a bearing on the description of the final states of mergers of binary black holes detected by LIGO and Virgo gravitational wave detectors.

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