



## **You Can't Overcharge/Overspin a Black Hole**

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The Kerr-Newman solutions are the only stationary black hole solutions of the Einstein-Maxwell equations in 4-dimensions. However, these solutions describe black holes only when the inequality  $M^2 \geq (J/M)^2 + Q^2$  is satisfied, where  $M, J,$  and  $Q$  are the mass, angular momentum, and charge of the black hole. Therefore, if an extremal or nearly extremal black hole can be made to absorb matter with sufficiently large angular momentum or charge as compared with its energy, one would obtain a serious contradiction with cosmic censorship. Hubeny and others have made proposals as to how this might be done, but a proper analysis would require a calculation of all second order effects on energy, including, in particular, effects arising from self-force. We show in this work that when all of the second order effects are taken into account, no overcharging or overspinning of a black hole can ever occur, provided only that the non-electromagnetic matter satisfies the null energy condition.