

A uniqueness result for higher-dimensional Reissner–Nordström manifolds

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We consider $n + 1$ -dimensional static solutions of the electrovacuum equations which are asymptotic to a member of the Reissner–Nordström family, with a lapse and an electric potential fulfilling some asymptotic conditions. Assuming that we are given such a spacetime whose inner boundary (a priori possibly with multiple connected components) consists of static horizons or photon spheres (which are characterized by a quasilocal subextremality condition), we show that it is isometric to a subextremal Reissner–Nordström spacetime of positive mass [3]. The proof relies on ideas going back to the well-known black hole uniqueness theorem by Bunting and Masood-ul Alam [1] and generalizes classical black hole uniqueness results, as well as recent photon sphere uniqueness theorems (e.g. [2]).

References

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- [2] Carla Cederbaum and Gregory J. Galloway. Uniqueness of photon spheres via positive mass rigidity. *Commun. Anal. Geom.*, 25(2):303–320, 2017.
- [3] Sophia Jahns. Photon sphere uniqueness in higher-dimensional electrovacuum spacetimes. In progress.