General Relativity and Quantum Cosmology

Charged cosmological dust solutions of the coupled Einstein and Maxwell equations

Joel Spruck (Johns Hopkins University), Yisong Yang (Polytechnic Institute of New York University)

(Submitted on 6 Jan 2010 (v1), last revised 28 Jan 2010 (this version, v2))

It is well known through the work of Majumdar, Papapetrou, Hartle, and Hawking that the coupled Einstein and Maxwell equations admit a static multiple blackhole solution representing a balanced equilibrium state of finitely many point charges. This is a result of the exact cancellation of gravitational attraction and electric repulsion under an explicit condition on the mass and charge ratio. The resulting system of particles, known as an extremely charged dust, gives rise to examples of spacetimes with naked singularities. In this paper, we consider the continuous limit of the Majumdar--Papapetrou--Hartle--Hawking solution modeling a space occupied by an extended distribution of extremely charged dust. We show that for a given smooth distribution of matter of finite ADM mass there is a continuous family of smooth solutions realizing asymptotically flat space metrics.

Subjects: **General Relativity and Quantum Cosmology (gr-qc)**; High Energy Physics - Theory (hep-th); Analysis of PDEs (math.AP)

Cite as: **arXiv:1001.0949v2 [gr-qc]**

Submission history

From: Joel Spruck [view email]

[v1] Wed, 6 Jan 2010 18:50:29 GMT (20kb)

[v2] Thu, 28 Jan 2010 17:11:51 GMT (20kb)

Which authors of this paper are endorsers?

Download:

- PostScript
- PDF
- Other formats

Current browse context:

gr-qc

< prev | next >

new | recent | 1001

Change to browse by:

hep-th

math

math.AP

References & Citations

- SLAC-SPIRES HEP (refers to | cited by)
- CiteBase

Bookmark(what is this?)

CiteULike logo

Connotea logo

BibSonomy logo

Mendeley logo

Facebook logo

del.icio.us logo

Digg logo Reddit logo