Quasi-Black Holes from Extremal Charged Dust
José P. S. Lemos lemos@kelvin.ist.utl.pt Physics Department, Columbia University, New York, NY 10027
and
Centro Multidisciplinar de Astrofísica - CENTRA, Departamento de Física, Instituto Superior Técnico,
Av. Rovisco Pais 1, 1049-001 Lisboa, Portugal
Erick J. Weinberg ejw@phys.columbia.edu Physics Department, Columbia University, New York, NY 10027

abstract One can construct families of static solutions that can be viewed as interpolating between
nonsingular spacetimes and those containing black holes. Although everywhere nonsingular, these solutions
come arbitrarily close to having a horizon. To an observer in the exterior region, it becomes increasingly
difficulty to distinguish these from a true black hole as the critical limiting solution is approached. In
this paper we use the Majumdar-Papapetrou formalism to construct such quasi-black hole solutions from
extremal charged dust. We study the gravitational properties of these solutions, comparing them with the
the quasi-black hole solutions based on magnetic monopoles. As in the latter case, we find that solutions
can be constructed with or without hair.