1053-83-124   **Luc Nguyen*** (`Luc.Nguyen@maths.ox.ac.uk`), Mathmatical Institute, University of Oxford, 24-29 St Giles', Oxford, OX1 5LB, England. *Regularity of harmonic maps with prescribed rate of singularity and axially symmetric stationary electro-vacuum spacetimes.*

According to the Ernst-Geroch reduction, to each axially symmetric stationary vacuum/electro-vacuum spacetime, one can associate an axially symmetric harmonic map with singular boundary behavior. This idea has been exploited in the literature to construct asymptotically flat, axially symmetric stationary spacetimes with disconnected horizons, i.e. having multiple black holes. This family of spacetimes is uniquely parameterized by the "masses", the "momenta", the "charges" of the black holes and the "distances" between them. I'll discuss the regularity of the corresponding reduced harmonic maps and its implication on the regularity of those spacetimes. (Received August 27, 2009)