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Caleb Andrew Meier* (c1meier@math.ucsd.edu) and **Michael Holst**. *Non-uniqueness of Solutions to the Conformal Formulation of the Einstein Constraint Equations.*

In this talk we investigate the uniqueness properties of solutions to the Einstein constraint equations on a closed manifold. In particular, we investigate whether or not solutions to the conformal formulation of the constraints with an unscaled data source are unique. For positive, constant scalar curvature and constant mean curvature, we first demonstrate the existence of a critical energy density for the Hamiltonian constraint. We then show that for this choice of energy density, the linearization of the elliptic system develops a one-dimensional kernel in both the constant mean curvature and non-constant mean curvature cases. Using a Liapunov-Schmidt reduction and standard techniques from bifurcation theory, we demonstrate that solutions to the conformal formulation with unscaled data source are non-unique by determining an explicit solution curve and analyzing its behavior in the neighborhood of a particular solution. (Received September 25, 2012)