

Meeting: 1000, Albuquerque, New Mexico, SS 8A, Special Session on Interactions in Riemannian Geometry

1000-53-71 **Andrew Dancer** and **McKenzie Y Wang*** (wang@mcmaster.ca), Department of Mathematics and Statistics, McMaster University, 1280 Main St. W., Hamilton, Ontario L8S 4K1, Canada.
Superpotentials and the Cohomogeneity One Einstein Equations. Preliminary report.

We will discuss a classification theorem, under certain hypotheses, for the existence of superpotentials for the cohomogeneity one Einstein equations. A superpotential for a Hamiltonian system is a globally defined function u on (momentum) phase space satisfying

$$H(du_q, q) = 0,$$

where $H(p, q)$ is the Hamiltonian. The above superpotential equation may be viewed as a time-independent Hamilton-Jacobi equation or as an eikonal equation associated to the (locally defined) Jacobi metric. For such a first order non-linear PDE, global smooth solutions are generally extremely rare, and this fact gives one hope that a complete classification may be possible. (Received August 13, 2004)