Meeting: 998, Houston, Texas, SS 20A, Special Session on Differential Geometry

998-53-209 **Tracy L Payne*** (payntrac@isu.edu), Department of Mathematics, Campus Box 8085, Idaho State University, Pocatello, ID 83209. *The Existence of Nilsoliton Metrics.*

A nilsoliton metric is a left-invariant metric on a nilpotent Lie group such that there exists a derivation D of the Lie algebra with $D = Ric - bId$, where Ric is the Ricci endomorphism, b is a real number, and Id is the identity map. This condition may be viewed as the Einstein condition at the second level of Lie algebra cohomology. Nilsoliton metrics have properties that make them preferred metrics on nilpotent Lie groups in the absence of Einstein metrics (Nonabelian nilpotent Lie groups do not admit left-invariant Einstein metrics).

We characterize the existence and uniqueness of nilsoliton metrics within classes of a natural partition of the space of nilpotent structures of fixed dimension. We associate to a nilpotent metric Lie algebra a generalized Dynkin diagram with weights at each vertex, and we show that the metric is a nilsoliton metric if and only if the weighting on the Dynkin diagram has a certain additive property.

Using results of J. Lauret, we get existence theorems for Einstein metrics on solvmanifolds. We also present continuous families of Einstein solvmanifolds around a quaternionic hyperbolic space and the Cayley plane.

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