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Tracy Payne* (payntrac@isu.edu), **Sara Ebrahimpour** and **Beau Hansen**. *Filiform Lie groups and their soliton metrics*. Preliminary report.

Nonabelian nilpotent Lie groups do not admit left-invariant Einstein metrics. However, they often admit soliton metrics, and by a result of J. Lauret, such nilpotent Lie groups always have solvable extensions that admit Einstein metrics. In this talk, we will survey the background and summarize main results in the area before we focus on the class of filiform nilpotent Lie groups. Filiform Lie groups are nilpotent Lie groups whose lower central series is as long as possible; i.e. having $n - 2$ nontrivial groups if the group's dimension is n . We determine which filiform Lie groups in low dimensions and certain infinite classes admit soliton metrics. However, since filiform Lie groups are not classified, we also need to address the classification problem, and we classify rank one filiform Lie algebras in low dimensions and some other special classes. As a corollary, we can classify which solvable Lie groups in certain classes admit Einstein metrics. (Received February 01, 2018)