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Ruth Gornet* (rgornet@uta.edu), University of Texas at Arlington, Math Dept Box 19408, Arlington, TX 76019-0408. *The wave invariants on two-step nilmanifolds.*

We calculate the wave invariants on two-step nilmanifolds. As an application, we compare the wave invariants of certain isospectral Heisenberg manifolds that exhibit interesting behavior in the length spectrum. In particular, these isospectral Heisenberg manifolds have different multiplicity in the length spectrum, where multiplicity of a length l is defined as the number of free homotopy classes of loops that can be represented by a closed geodesic of length l . (Received August 23, 2005)