WILLARD MILLER, JR., University of Minnesota, Minneapolis, Minnesota
Second-order superintegrable systems

A Schrödinger operator with potential on a Riemannian space is 2nd-order superintegrable if there are $2n-1$ (classically) functionally independent 2nd order symmetry operators. (The $2n-1$ is the maximum possible number of such symmetries.) These completely integrable Hamiltonian systems are of special interest because they are multi-integrable, even multiseparable, *i.e.*, variables separate in several coordinate systems, and the systems are explicitly solvable in terms of special functions.

We first give examples of superintegrable systems and then we present very recent results giving the general structure of superintegrable systems in all 2D, and 3D conformally flat spaces, and a complete list of such spaces and potentials in 2D. The results reported here were obtained in collaboration with E. G. Kalnins, G. S. Pogosyan and J. Kress.