

## Second-order superintegrable Hamiltonian systems via conformal and information geometry

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Second-order maximally superintegrable Hamiltonian systems are important structures in mathematical physics. Famous examples are the Kepler-Coulomb system and the Harmonic Oscillator.

We establish a geometric framework for a large class of these systems (joint work with J. Kress and K. Schöbel). It encodes the superintegrable system in a  $(1,2)$ -tensor field.

This geometric data reflects a naturally underlying Weyl (i.e. conformal) structure. Moreover, it induces the natural structure of a statistical manifold with torsion.

To illustrate the general framework, we present a class of examples called “abundant systems”. These can be realized as affine hypersurfaces (joint work with V. Cortés). In particular, on spaces of constant sectional curvature, we find a one-to-one correspondence between these superintegrable systems and (non-flat) Frobenius manifolds whose underlying Riemannian metric can be written as the second derivative of a function (“Hessian structure”, partly joint with J. Armstrong).

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