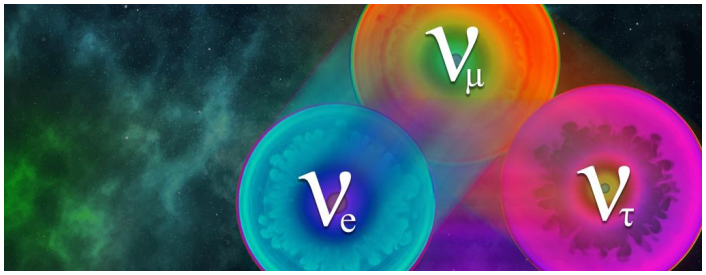


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# From kinetic gases to an accelerated expanding universe - The Finsler Friedmann equation

*Wednesday, 21 January 2026 10:05 (35 minutes)*

The dynamics and the gravitational field of kinetic gases are usually described by the Einstein-Vlasov/Boltzmann equations. The evolution of the gas on phase space is encoded in the 1-particle distribution function (1PDF), while the Einstein equations determine the gravitational field of the kinetic gas from an energy momentum tensor that is obtained by averaging the 1PDF over all physical gas particle velocities (or momenta). Thus, the dynamics of the kinetic gas are described on phase space, but its gravitational field is derived on spacetime through an averaging procedure, which does not take all available information of the gas into account. The immediate questions is, how does the full 1PDF of a kinetic gas gravitate?

In this talk, I will discuss that Finsler gravity naturally elevates the geometry of spacetime to the same phase space footing as kinetic gas matter. It couples the full 1PDF to gravity without loosing information through averaging. In homogeneous and isotropic symmetry, the Finsler gravity equation takes a similar form as the Friedmann equations. Remarkably we find that this Finsler Friedmann equation possesses solutions describing an accelerated expanding universe without the need of a cosmological constant or any other additional quantities.

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