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Stochastic aspects for cosmic fluids

I will present a new upcoming theme of research based on stochastic aspects of the cosmic fluids. The aim is to develop new foundations for a mesoscopic intermediate scale theory, which helps to probe nature and evolution of dense matter in compact stars and early universe cosmology around the era of decoherence of the inflaton field, at intermediate sub-hydro scales. Connections of generalized stochastic effects which suit an underlying spacetime structure with various phenomena like dissipation turbulences etc in the superfluid matter of dense compact matter will be discussed. Foundations for such a theory have just begun to take shape and open up new directions to explore and investigate in relativistic astrophysics for multi-scale phenomena which are suitable for simulations as well as observations in near future. The initial basic formalism with such a purpose that is taking shape is the classical Einstein-Langevin equation with its applications to relativistic astrophysics.

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