Contribution ID: **91** Type: **Talk/seminar**

Ricci Cosmology in light of astronomical data

Thursday 9 September 2021 12:10 (20 minutes)

From the study of relativistic dynamics of fluids out of equilibrium in a curved background, a new cosmological framework, dubbed Ricci Cosmology, has emerged in which linear terms in Ricci scalar and Ricci tensor lead to modifications of the equilibrium pressure in the energy-momentum tensor in the fluids filling the Universe. The coefficients in front of such terms are called second order transport coefficients and parametrise the fluids response to the pressure terms arising from the spacetime curvature.
Under the assumption of constant coefficients, we find the simplest solution in which the presence of such terms causes a departure from the perfect fluid redshift scaling for matter components in the Universe. By using the second law of thermodynamics, theoretical bounds on the transport coefficients are imposed. In order to test the viability of this solution, we make four different ansätze on the transport coefficients, giving rise to four different cases of our model. The observational bounds on the second order transport coefficients obtained by testing each case against cosmological data are compatible with the thermodynamical bounds and indicate that Ricci Cosmology is compatible with ΛCDM cosmology for all the ansätze.

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Session Classification: Ph.D. Students Workshop