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Shan–Chen interacting vacuum cosmology

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In this talk, I will introduce a novel class of interacting vacuum dark energy models, based on recasting the equation of state originally developed in the context of lattice kinetic theory by Shan & Chen (1993) as the coupling between the vacuum and cold dark matter (CDM). This coupling allows the vacuum to evolve and is nonlinear around a characteristic energy scale ρ_* , changing into a linear coupling with a typical power law evolution at scales much lower and much higher than ρ_* . I will illustrate the various possible models that can arise from the Shan–Chen coupling, with several different behaviours at both early and late times depending on the values of the model parameters selected. I will show the first observational constraints obtained on these models, focusing on those in which the nonlinearity of the coupling is relevant at late times. I will show how current observational data is compatible with the Shan–Chen interacting vacuum cosmology but that the H_0 and σ_8 tensions remain present in this scenario.

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Classification de Session: Modified gravity and simulations