Contribution ID: **48** Type: **not specified**

Theory: Bouncing and emergent cosmology from Dark Energy with an unstable de Sitter vacuum

Thursday, September 7, 2023 2:00 PM (15 minutes)

Dark energy (DE) typically violates the same energy conditions that imply cosmological singularities, hence a DE that dominates at high energy can produce a singularity-free cosmology. If the DE conservation equation admits a high-energy fixed point, this represents an unstable de Sitter vacuum: for flat and open FLRW models this de Sitter state represents the past attractors for what then is an emergent cosmology; for closed models it give rise to a potential barrier against which they bounce off, expanding after contraction. For a suitable equation of state the DE can have a second low-energy fixed point, representing an asymptotic cosmological constant. The DE dominates at nearly times and produces an accelerated phase, following by a decelerated matter dominated phase, finally accelerating again, producing a qualitatively realistic scenario. If DE and Cold Dark Matter (CDM) are suitably nonlinearly coupled at high energy, the coupling naturally produces a high energy de Sitter phase, with flat and open emergent models and closed models bouncing, with all models possibly ending up in a realistic low energy accelerated phase after standard radiation and matter era. In this talk I illustrate these scenario using qualitative methods for specific DE models, coupled and uncoupled. I end with speculations about the extension of this analysis to Bianchi IX models.

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Session Classification: Parallel Sessions