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Advances in $\Lambda_{\rm s}$CDM Cosmology: Towards Resolving Multiple Cosmological Tensions

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The sign-switching cosmological constant cold dark matter ($\Lambda_{\rm s}$CDM) cosmology has emerged as a promising new paradigm, showing notable success in reconciling observational data from diverse probes and in addressing major cosmological tensions, such as the H_0, S_8, and γ (growth index) discrepancies. The model introduces a minimal but non-trivial modification to the standard ΛCDM framework by positing a rapid Anti-de Sitter (AdS) to de Sitter (dS) transition in the late universe ($z_\dagger \sim 1.7$), as originally conjectured in the context of graduated dark energy (gDE). The talk will begin with a concise review of $\Lambda_{\rm s}$CDM cosmology, followed by a presentation of recent theoretical and observational developments that highlight its potential role as a candidate framework guiding the search for a renewed concordance cosmology.

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