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Ruling out Strongly Interacting Dark Matter–Dark Radiation Models from Joint Observations of Cosmic Microwave Background and Quasar Absorption Spectra

The cold dark matter (CDM) paradigm provides a remarkably good description of the Universe's large-scale structure. However, some discrepancies exist between its predictions and observations at very small sub-galactic scales. To address these issues, the consideration of a strong interaction between dark matter particles and dark radiation emerges as an intriguing alternative. In this talk, we explore the constraints on those models using joint observations of Cosmic Microwave Background (CMB) and Quasars absorption spectra with our previously built parameter estimation package CosmoReionMC. At 2-σ confidence limits, our analysis rules out all strongly interacting Dark Matter - Dark Radiation models proposed to date, representing the most stringent constraint on those models to the best of our knowledge.

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