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Impact of a Λ CDM extension on UHECRs

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The existing discrepancies between the observation of local and extraction of global cosmological parameters are driving the need for an extension of the Λ CDM cosmological model. A proposed extension called SU(2)CMB describes cosmic microwave background (CMB) photons with an SU(2) instead of a U(1) gauge group. This reduces some of these tensions (such as H_0 , Ω_m , Ω_b), pushes the recombination epoch to higher redshifts, and thereby effectively reduces CMB photon densities. Ultra-high energy cosmic ray (UHECR) interactions with CMB photons are critical to our understanding of the observed flux of all cosmic messengers (cosmic rays, neutrinos and photons). The measured and predicted fluxes are the basis used to constrain source properties and rely on the Λ CDM CMB evolution. Thus, a modification of the past CMB densities impacts these flux predictions and possibly the constraints on the sources. This contribution discusses the impact of the modified CMB evolution on multimessenger studies. In particular, we show the effects of the Λ CDM extension on the UHECR propagation horizon, increased cosmogenic neutrino fluxes, and the changes in source properties inferred from the U

Presenter: MEINERT, Janning (Bergische Universität Wuppertal)

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