

Cosmological Frontiers in Fundamental Physics Triangular Conference : APC - Perimeter - Solvay 2021



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Testing the Cosmological Principle

mercredi 26 mai 2021 17:30 (40 minutes)

We study the large-scale anisotropy of the Universe by measuring the dipole in the angular distribution of a flux-limited, all-sky sample of 1.36 million quasars observed by the Wide-field Infrared Survey Explorer (WISE). This sample is derived from the new CatWISE2020 catalog, which contains deep photometric measurements at 3.4 and 4.6 μm from the cryogenic, post-cryogenic, and reactivation phases of the WISE mission. While the direction of the dipole in the quasar sky is similar to that of the cosmic microwave background (CMB), its amplitude is over twice as large as expected, rejecting the canonical, exclusively kinematic interpretation of the CMB dipole with a p-value of 5×10^{-7} (4.9σ for a normal distribution, one-sided), the highest significance achieved to date in such studies. Our results are in conflict with the cosmological principle, a foundational assumption of the concordance ΛCDM model.

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Classification de Session: Second Session, Wednesday