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Hints of Cosmological Parity Violation

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Observations of the Cosmic Microwave Background (CMB) have cemented the notion that the large-scale Universe is both statistically homogeneous and isotropic. But is it invariant also under mirror reflections? Recently, observations of CMB polarization (through birefringence) and the distribution of galaxies (through four-point functions, or trispectra) have challenged this notion, and give tentative evidence for new parity-violating processes at work in the early or late Universe. In this talk, I will discuss these measurements, focusing primarily on the parity-violating signature seen in the BOSS galaxy sample. I will present an overview of how the measurements are made and interpreted before commenting on possible explanations for the signal, both in terms of new physics (from inflation or modified gravity) and systematics (in the observations or analysis). I will further outline the possibilities for solving this cosmic controversy with new data in the coming years.

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