

# Anomalous parity asymmetry of WMAP power spectrum data at low multipoles: is it cosmological or systematics?

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We have investigated the odd-parity preference of the WMAP 7 year power spectrum. Our investigation shows parity asymmetry of the WMAP data ( $2 \leq l \leq 22$ ) is anomalous at 4-in-1000 level. We also find it likely that low quadrupole power is part of this parity asymmetry rather than an isolated anomaly. We have investigated non-cosmological causes for the odd-parity preference, but have not found a definite non-cosmological origin. WMAP7 data possesses most anomalous odd-parity preference, while they have more accurate calibration and less foreground contamination than earlier data. Besides that, the anomaly is associated with the WMAP power spectrum data, in which most efforts have been exerted to minimize systematics. Therefore, we find it unlikely that calibration or foregrounds are the source of the anomaly. We have also considered primordial origin for the parity asymmetry. However, we find primordial origin requires violation of translational invariance on large scales.

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