

The Wilkinson Microwave Anisotropy Probe (WMAP) is a spacecraft which measures differences in the Cosmic Microwave Background (CMB) across the full sky at microwave wavelengths. The WMAP spacecraft was launched on June 30, 2001 from Florida. WMAP's measurements played the key role in establishing the Lambda-CDM model for cosmology. WMAP data empirically confirm a universe dominated by dark energy in the form of a cosmological constant.

Copi, Huterer, Schwarz, and Starkman applied the multipole vector framework to full-sky maps based on the first year WMAP data. The planes of the quadrupole and octopole are surprisingly aligned with the geometry and direction of motion of the solar system. What might explain this surprising alignment? Copi, Huterer, Schwarz, and Starkman offer 4 possibilities:

- (1) there is a systematic error, i.e., some error in data analysis or instrument function;
- (2) the source is astrophysical, i.e., some unexpected problem with the foreground;
- (3) there really is a cosmological anisotropy;
- (4) the observed correlations are a purely statistical fluke.

Is possibility (2) indicated because the Sun-caused gravitational lensing is slightly different from the predictions of general relativity theory? According to Milgrom's MODified Newtonian Dynamics (MOND), Newtonian gravitational theory and general relativity theory are both slightly wrong. Fernández-Rañada suggested that the Pioneer anomaly is due to anomalous gravitational acceleration of clocks. However, Fernández-Rañada ignored both MOND and M-theory. According to Witten, M-theory predicts gravity in the form of general relativity theory, non-abelian gauge theory, and supersymmetry (SUSY). If M-theory with the infinite nature hypothesis is correct, then supersymmetric particles in some form should explain dark matter. A bizarre Fermi pairing of neutralinos might explain why the equivalence principle seems to fail for dark matter. If M-theory with the finite nature hypothesis is correct, then SUSY occurs not as particles but as symmetry principles within Wolfram's automaton. If M-theory is empirically invalid, then Fernández-Rañada's theory of modified general relativity theory might be correct, or someone else's theory might be correct. In any case, empirical evidence suggests that the Rañada-Milgrom effect is approximately correct. The Rañada-Milgrom effect says that, for reasons of apparent or real physics, the $-1/2$ in the standard form of Einstein's field equations should be replaced by $-1/2 + \sqrt{(60 \pm 10)/4} \cdot 10^{-5}$. If the Rañada-Milgrom effect is empirically valid and the WMAP data analysis ignores this effect, then the excess gravitational redshift caused by the Sun would show up as correlations with the Sun's motions and the orientation of the ecliptic plane with respect to the signals detected by the WMAP satellite.

http://en.wikipedia.org/wiki/Wilkinson_Microwave_Anisotropy_Probe

C. J. Copi, D. Huterer, D. J. Schwarz, G. D. Starkman (2006) "On the large-angle anomalies of the microwave sky" Monthly Notices of the Royal Astronomical Society, vol. 367, pages 79-102 <http://www.arxiv.org/abs/astro-ph/0508047>

http://en.wikipedia.org/wiki/Modified_Newtonian_dynamics

http://en.wikipedia.org/wiki/Pioneer_anomaly

<http://www.sns.ias.edu/~witten/papers/duality.pdf> "Duality, Spacetime and Quantum Mechanics" by Edward Witten