

Finding Evidence for Inflation and the Origin of Galactic Magnetic Fields with CMB Surveys

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The origin of the microgauss magnetic fields observed in galaxies is unknown. One scenario is that primordial magnetic fields (PMFs) generated during inflation, larger than 0.1 nanogauss on Mpc scales, were compressed to microgauss strengths in galaxies during structure formation. Thus, detecting such a PMF just after recombination would be evidence of this inflationary origin. We find that CMB-HD measurements of anisotropic birefringence would lower the upper bound on scale-invariant PMFs to 0.072 nanogauss at the 95% CL. If inflationary PMFs exist, CMB-HD would be able to detect them with 3-sigma significance or higher, providing evidence for inflation itself.

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