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The CMB as a detector of high-frequency gravitational waves

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In the presence of magnetic fields, gravitational waves are converted into photons and vice versa. We demonstrate that this conversion leads to a distortion of the cosmic microwave background (CMB), which can serve as a detector for MHz to GHz gravitational wave sources active before reionization. The non-observation of such distortions gives rise to bounds exceeding laboratory constraints. Future advances in 21cm astronomy may conceivably push these bounds below the sensitivity of cosmological constraints on the total energy density of gravitational waves.

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