

Whispers from the Dark Universe - Particles & Fields in the Gravitational Wave Era

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WHISPERS FROM THE DARK UNIVERSE – PARTICLES & FIELDS IN THE GRAVITATIONAL WAVE ERA

HELMHOLTZ

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High-frequency gravitational waves shining in photons in Galactic magnetic fields

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High-frequency gravitational waves ($f \sim 10^9 - 10^{26}$ Hz) are a smoking gun for the existence of exotic physics. Indeed, GW backgrounds generated in the early Universe could be characterized by high-frequency signals, allowing one to probe inflation, first-order phase transitions, topological defects and primordial black holes. The lack of current and future gravitational waves experiments sensitive at those frequencies leads to the need of employing different indirect techniques. Notably, one of the most promising one is constituted by graviton-photon conversions in magnetic fields. In this talk, I will focus on conversions of a stochastic gravitational wave background into photons inside the Milky-Way B-fields. I will discuss how graviton-to-photon conversions may lead to unexpected imprints in the Cosmic Photon Background (CPB) spectrum in the range of frequencies $f \sim 10^9 - 10^{26}$ Hz. Hence, the absence of any significant evidence for a diffuse photon flux induced by gravitational-wave conversions induce stringent constraints on the gravitational-wave strain h_c .

Primary authors: LELLA, Alessandro (INFN-National Institute for Nuclear Physics); MIRIZZI, Alessandro (University of Bari); CALORE, Francesca (CNRS, LAPTh); CARENZA, Pierluca (Università degli Studi di Bari)

Presenter: LELLA, Alessandro (INFN-National Institute for Nuclear Physics)

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