## PLANCK2025 - The 27th International Conference From the Planck Scale to the Electroweak Scale



Contribution ID: 15

Type: not specified

## Optical gravitational waves as signals of Gravitationally-Decaying Particles

Thursday 29 May 2025 17:00 (20 minutes)

Long-lived heavy particles present during the big bang could have a decay channel opened by gravitons. Such decays can produce gravitational waves with large enough abundance to be detectable, and a peculiar narrow spectrum peaked today around optical frequencies. We identify which particles can decay in one or two gravitons. The maximal gravitational wave abundance arises from theories with extra hidden strong gauge dynamics, such as a confining pure-glue group. An interesting abundance also arises in theories with perturbative couplings. Future observation might shed light on early cosmology and allow some spectroscopy of sub-Planckian gravitationally-decaying particles, plausibly present in a variety of theories such as gauge unification, supersymmetry, extra dimensions, strings.

Primary author: STRUMIA, Alessandro (Unipi)Presenter: STRUMIA, Alessandro (Unipi)Session Classification: Gravitational Waves and Scalar perturbations