Contribution ID: 53

Type: Parallel oral presentation

## VSR Linearized Gravity: A Gauge-Invariant Graviton Mass

Tuesday 15 November 2022 14:45 (15 minutes)

Linearized gravity in the Very Special Relativity (VSR) framework is considered. We prove that this theory allows for a non-zero graviton mass  $m_g$  without breaking gauge invariance nor modifying the relativistic dispersion relation. We find the analytic solution for the new equations of motion in our gauge choice, verifying as expected the existence of only two physical degrees of freedom. Finally, through the geodesic deviation equation, we confront some results for classic gravitational waves (GW) with the VSR ones: we see that the ratios between VSR effects and classical ones are proportional to  $(m_g/E)^2$ , E being the energy of a graviton in the GW. For GW detectable by the interferometers LIGO and VIRGO this ratio is at most  $10^{-20}$ . However, for GW in the lower frequency range of future detectors, like LISA, the ratio increases significantly to  $10^{-10}$ , that combined with the anisotropic nature of VSR phenomena may lead to observable effects.

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Session Classification: Parallel session B

Track Classification: Cosmology and gravitation