Proca seminars series



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The gravitational spin Hall effect of light

Thursday 18 November 2021 10:00 (1 hour)

Abstract: The propagation of electromagnetic waves in vacuum is often described within the geometrical optics approximation, which predicts that wave rays follow null geodesics. However, this model is valid only in the limit of infinitely high frequencies. At large but finite frequencies, diffraction can still be negligible, but the ray dynamics becomes affected by the evolution of the wave polarization. Hence, rays can deviate from null geodesics, which is known as the gravitational spin Hall effect of light. By considering the WKB approximation for Maxwell's equations, I will briefly present the main steps of a covariant derivation of the polarization-dependent ray equations describing the gravitational spin Hall effect of light. I will also discuss the relation of these equations with the well-known MPD equations, as well as the observer dependence of the position of massless spinning particles.

Presenter: Dr OANCEA, Marius (Max Planck Inst for Gravitational Physics, Potsdam)