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Gravitational analog of Gertsenshtein-Zeldovich effect.

Correspondence between gravity and other fields in gauge theories is yet to be well understood and experimentally verified. The linearity of other gauge theories(such as Maxwell's theory) and the nonlinearity of general relativity make exploring this realm of gravity quite strenuous. The Gertsenshtein-Zeldovich (GZ) effect belongs to this realm, where electromagnetic (EM) waves passing through a region with very high magnetic fields produce gravitational waves (GW). This work aims to look for the generation of GW from the interaction of a test EM pulse with the curvature of a static and spherically symmetric massive object. We name it a gravitational analog to the GZ effect. In this gravitational analog, the spacetime curvature acts as a catalyst. In this talk, using covariant $1+1+2$ formalism, we explicitly show a test EM pulse in a static and spherically symmetric spacetime, resulting in a flux of GW. We quantify this using the Regge Wheeler tensor, which mimics the generated GW sourced by the EM energy and flux. We also discuss the implications for EM and GW memory.

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