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Detection of high-frequency gravitational waves using high-energy pulsed lasers

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We propose a new method for detecting high-frequency gravitational waves (GWs) using high-energy pulsed lasers. Through the inverse Gertsenshtein effect, the interaction between a GW and the laser beam results in the creation of an electromagnetic signal. The latter can be detected using single-photon counting techniques. We present the minimal strain of a detectable GW which only depends on the laser parameters. Interestingly, we find that a resonance occurs in this process when the frequency of the GW is twice the frequency of the laser. With this method, the ultra-high GW-frequency range 10ˆ{13} - 10ˆ{19} Hz is explored non-continuously for strains h
$gtrsim 10^{-20}$ for current laser systems and can be extended to h
$gtrsim 10^{-26}$ with future generation facilities.

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