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Detectability of stochastic gravitational wave background from weakly hyperbolic encounters

This talk concerns the computation of the stochastic gravitational wave (GW) background generated by black hole-black hole (BH-BH) hyperbolic encounters with eccentricities close to one and their comparison with the respective sensitivity curves of planned GW detectors. In this study we took into account hyperbolic encounters that take place in clusters up to redshift 5 and with BH masses spanning from $5 M_{\odot}$ to $55 M_{\odot}$. We studied several cluster models with different mass and virial velocity, and finally obtain an accumulative result, displaying the background as an average. Our results suggest that the background from these encounters is likely to be detected by the third-generation detectors Cosmic explorer and Einstein telescope, while the tail section at lower frequencies intersects with DECIGO, making it a potential target source for both ground and space-based future GW detectors.

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