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Detecting Strong Gravitational Lensing of Gravitational Waves with TianQin

Tuesday, December 12, 2023 3:00 PM (15 minutes)

We discuss the capability of TianQin to detect lensed MBHB signals. Three lens models are considered in this work: the point mass model, the SIS model, and the NFW model. The sensitive frequency band for space-borne $\text{ac}\{\text{GW}\}$ detectors is around milli-hertz, and the corresponding GW wavelength could be comparable to the lens gravitational length scale, which requires us to account for wave diffraction effects. In calculating lensed waveforms, we adopt the approximation of geometric optics at high frequencies to accelerate computation, while precisely evaluate the diffraction integral at low frequencies. Through a Fisher analysis, we analyse the accuracy to estimate the lens parameters. We also assess the impact on the accuracy of estimating the source parameters.

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