



Contribution ID: 60

Type: **not specified**

The dark timbre of gravitational waves

Thursday 20 June 2024 17:00 (15 minutes)

Gravitational wave timbre, the relative amplitude and phase of the different harmonics, can change due to interactions with low-mass halos. We focus on binaries in the LISA range and find that the integrated lens effect of cold dark matter structures can be used to probe the existence of $M_{\nu} \approx 10 M_{\oplus}$ halos if a single binary with eccentricity $e = 0.3-0.6$ is detected with a signal-to-noise ratio $100 - 10^4$.

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Session Classification: Talks