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LISA parameter estimation and sky localization with higher harmonics of the ringdown[1] VISHAL BAIBHAV, EMANUELE BERTI, Johns Hopkins University, VITOR CARDOSO, Instituto Superior Tcnico — Higher harmonics of the ringdown gravitational wave signal from massive black-hole binary mergers can be detected with a large signal-to-noise ratio (SNR) by LISA, while their inspiral contributes little to the SNR. These binaries are also more likely to have electromagnetic counterparts. Can we extract the binary parameters and localize the source using LISA observations of the ringdown only? In general, LISA inspiral sources are long-lived, and LISAs motion around the Sun modulates the amplitude and phase of the signal, which in turn can be used to disentangle the source location and orientation. On the contrary, the ringdown is very short-lived, and hence we cannot use the modulation of the antenna pattern for localization. We show that (i) the mass ratio and inclination of a binary can be measured by carefully combining multiple ringdown harmonics, and (ii) we can constrain the sky location and luminosity distance by relying on the relative amplitudes and phases of various harmonics, as measured in different LISA channels.

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