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Archival Searches for Stellar-Mass Binary Black Holes in LISA BECCA EWING, Pennsylvania State University, B.S. SATHYAPRAKASH, Pennsylvania State University, Cardiff University, SURABHI SACHDEV, SSOHRAB BORHANIAN, Pennsylvania State University — Stellar-mass binary black holes sweep through the frequency band of the Laser Interferometer Space Antenna (LISA) for months to years before appearing in the audio-band of ground-based gravitational-wave detectors. One can expect several tens of these events up to a distance of 500 Mpc each year. The LISA signal-to-noise ratio for such sources even at these close distances will be too small for a blind search to confidently detect them. However, next generation ground-based gravitational-wave detectors, expected to be operational at the time of LISA, will observe them with signal-to-noise ratios of several thousands and measure their parameters very accurately. By leveraging these capabilities, we can significantly reduce the computational costs of detecting these signals in LISA by using archival searches. We demonstrate that this strategy can reduce the required number of templates for a matched-filter search to a few x 10ˆ3 allowing us to detect events with signal-to-noise ratios as low as 4 – 6.We show that such high-fidelity observations of these sources by ground-based detectors helps in archival searches to dig tens of signals out of LISA data each year.

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