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Detecting EMRIs in Gravitational Wave Data with Harmonic Structure[1] NAOMI SHECHTER, DePaul University, SHANE LARSON[2], Northwestern University — Gravitational waves, like electromagnetic waves, transmit radiation with information about the source encoded within, and Extreme Mass Ratio Inspirals (EMRIs) are one such source. EMRIs are compact stellar mass objects which spiral inward toward a massive or supermassive black hole; as the orbit decays, the object's waveform maps out the changing spacetime of its environment. The launching of LISA will allow physicists to collect gravitational wave data from these populous sources, clarifying our understanding of extreme relativistic conditions and the evolution of supermassive black holes. This poster illustrates an EMRI analysis technique called harmonic correlation, which will be useful for the detection of EMRI signals even at a low SNR ratio. To investigate the effectiveness of this method under different conditions, we simulated a gravitational waveform and noise, then ran the simulated data through a harmonic correlation with a variety of EMRI parameters and signal strengths. Our results confirmed that harmonic correlation will be a useful technique to streamline the analysis of LISA data and the detection of EMRI signals.

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