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## Identification of Gravitational-waves from Extreme Mass Ratio Inspirals

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Space-based gravitational wave detectors like TianQin or LISA could observe extreme-mass-ratio-inspirals (EMRIs) at millihertz frequencies. The accurate identification of these EMRI signals from the data plays a crucial role in enabling in-depth study of astronomy and physics. We aim at the identification stage of the data analysis, with the aim to extract key features of the signal from the data, such as the evolution of the orbital frequency, as well as to pinpoint the parameter range that can fit the data well for the subsequent parameter inference stage. In this manuscript, we demonstrated the identification of EMRI signals without any additional prior information on physical parameters. High-precision measurements of EMRI signals have been achieved, using a hierarchical search. It combines the search for physical parameters that guide the subsequent parameter inference, and a semi-coherent search with phenomenological waveforms that reaches precision levels down to  $10^{-4}$  for the phenomenological waveform parameters  $\omega_0$ ,  $\dot{\omega}_0$ , and  $\ddot{\omega}_0$ . As a result, we obtain measurement relative errors of less than 4% for the mass of the massive black hole, while keeping the relative errors of the other parameters within as small as 0.5%.arXiv:2310.03520

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