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Gravitational waves from eccentric sub-solar mass compact binaries[1] YIFAN WANG, ALEX NITZ, Max Planck Inst for Gravitational Physics — We study the gravitational waves from eccentric sub-solar mass black hole binaries which due to their mass would have to be primordial in origin instead of stellar evolution. Soon after formation in the early Universe, primordial black holes may form binaries. Alternatively, primordial black holes as dark matter can also form binaries in the late Universe due to dynamical encounter and gravitational-wave braking. We investigate the eccentricity distribution of binary primordial black holes from this late Universe formation channel at gravitational-wave frequency 10 Hz and find that the signals can retain non-negligible eccentricity. We use simulated gravitational wave data to study the ability to search for eccentric gravitational wave signals using a circular waveform template bank. A targeted search on LIGO/Virgo open data is also performed with the gravitational waveform for eccentric compact binary coalescence. The null results place new limits on astrophysical models for primordial black hole binary formation.

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Yifan Wang
Max Planck Inst for Gravitational Physics

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