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BANKS, Hannah (University of Cambridge)

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Long baseline atom interferometers offer an exciting opportunity to explore mid-frequency gravitational waves. In this work we survey the landscape of possible contributions to the total 'gravitational wave background' in this frequency band and advocate for targeting this observable. Such an approach is complimentary to searches for resolved mergers from individual sources and may have much to reveal about the Universe. We find that the inspiral phases of stellar-mass compact binaries cumulatively produce a signal well within reach of the proposed AION-km and AEDGE experiments. Hypothetical populations of dark sector exotic compact objects, harbouring just a tiny fraction of the dark energy density, could also generate signatures unique to mid- and low-frequency gravitational wave detectors, providing a novel means to probe complexity in the dark sector.

Poster Abstract

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