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Using Bose-Einstein Condensates as Gravitational Wave Detectors

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With the recent direct observation of gravitational waves, a new avenue of observing the Universe has become available. As a result, much effort is being devoted to the design of new detectors sensitive to different gravitational wave sources. One unique proposal is to detect gravitational waves using a Bose-Einstein Condensate (BEC) by using quantum metrology.

In this talk, I will show that transient gravitational wave detection using BECs is limited at lower frequencies by methods in quantum optics and by damping at higher frequencies. For continuous sources, an oscillating speed of sound is considered as a means to amplify sensitivity. I will discuss the prospects and challenges for such detectors to be competitive to existing gravity wave detectors.

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