

Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Optical frequency standards for gravitational wave detection using satellite velocimetry AMAR VUTHA, York University — Satellite Doppler velocimetry, building on the work of Kaufmann [1] and Estabrook and Wahlquist [2], is a complementary technique to interferometric methods of gravitational wave detection [3]. This method is based on the fact that the gravitational wave amplitude appears in the apparent Doppler shift of photons propagating from an emitter to a receiver. This apparent Doppler shift can be resolved provided that a frequency standard, capable of quickly averaging down to a high stability, is available. We present a design for a space-capable optical atomic frequency standard, and analyze the sensitivity of satellite Doppler velocimetry for gravitational wave astronomy in the milli-hertz frequency band.

[1] Kaufmann, W. (1970). Redshift Fluctuations Arising from Gravitational Waves. *Nature*, 227, 157.

[2] Estabrook, F., & Wahlquist, H. (1975). Response of Doppler spacecraft tracking to gravitational radiation. *General Relativity and Gravitation*, 5(5), 439-447.

[3] Armstrong, J. (2006). Low-frequency gravitational wave searches using spacecraft Doppler tracking. *Living Rev. Relativity*, (2006).

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Date submitted: 07 Jan 2015

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