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Dual continuous cold atom beam accelerometer/gyroscope. MICHAEL MANICCHIA, JEFF LEE, U.S. Naval Postgraduate School, GEORGE WELCH, Texas AM University, FRANK NARDUCCI, U.S. Naval Postgraduate School — We report on studies completed while constructing a continuous dual atom beam accelerometer/ gyroscope. Two opposing beam atom interferometers can distinguish between linear and rotational motion. Our design uses cold and slow moving atoms that originate from a 2D magneto-optical trap (MOT). The transit time of these atoms through continuous Raman laser fields acts as the 'pulse' of light for the interferometer atom optics. We use a lock-in detection method for improved signal-to-noise ratio. We also explore the effects of different hyperfine transitions within the ^{85}Rb D2 line for optical pumping effectiveness. We find that the optical pumping beam can also be used as a shutter on the atomic beam. We present the status of the construction of our prototype. We present measurements of narrow velocity profiles from our source and compare the results to a time-of-flight measurement performed on the source when it is pulsed. Finally, we demonstrate Raman spectroscopy and Ramsey interference in the system. This work was funded by the Office of the Secretary of Defense.

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