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Rotation Measurement with a K-Rb-\(^{21}\)Ne Atomic Spin Co-magnetometer Gyroscope

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— Co-magnetometers based on K-\(^{3}\)He and K-Rb-\(^{21}\)Ne [1] have been used to test of CPT symmetry. For the K- Rb-\(^{21}\)Ne co-magnetometer, due to the gyroscopic effect of the \(^{21}\)Ne nuclear spin, it can also be used to sense small rotation. For inertial navigation application, \(^{21}\)Ne atoms, whose gyromagnetic ratio is an order of smaller than \(^{3}\)He, is better to be used to sense rotation. The spin projection noise of a K-Rb-\(^{21}\)Ne co-magnetometer with measurement volume of 1cm\(^3\) could be on the order of 10\(^{-10}\) rad/s/Hz\(^{1/2}\). A K-Rb-\(^{21}\)Ne co-magnetometer gyroscope has been designed. It is under constructing in our laboratory and the rotation of the earth should be measured by this apparatus. We also have made alkali vapor cells filled with K and Rb atoms, whose mole fraction ratio is controlled by analytical balance operated in the anaerobic glove box.


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