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Dynamics of Two Overlapping Spin Ensembles Interacting by Spin Exchange with Large Rb Magnetization Field YAO CHEN, JIANCHENG FANG, Beihang University — Two spin ensembles which occupy the same volume in a spherical alkali vapor cell can be coupled together by the spin exchange interaction. In a K-Rb- ^{21}Ne co-magnetometer which was used for rotation sensing, Rb atomic spins and the ^{21}Ne nuclear spins couple together by spin exchange. Due to the large Rb density and the Fermi contact constant of Rb- ^{21}Ne pair, the magnetization field of Rb atomic spins is much larger than that of the K in a K- ^3He co-magnetometer. At the co-magnetometer working point, the precession frequency of Rb atomic spins are much larger than that of the ^{21}Ne spins. The decay rate and precession frequency of ^{21}Ne atoms is much smaller than that of the point when the precession frequencies of the Rb and ^{21}Ne atoms are the same. In this experiment, the dynamics of the Rb- ^{21}Ne pair at different holding magnetic field points were studied. The frequency response of the co-magnetometer to oscillating magnetic field at different holding magnetic field points was also studied.

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