

Abstract Submitted
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Measurement of the spin-density wave propagation speed in a spinor Bose-Einstein condensate DEOKHWA HONG, JOON HYUN KIM, YONG-IL SHIN, Seoul National University — We experimentally measure the propagation speed of spin-density waves in a spin-1 antiferromagnetic spinor Bose-Einstein condensate of ^{23}Na atoms. Spin-density waves are generated by perturbing the condensate with a focused laser beam, whose frequency is tuned between the D_1 and D_2 transitions of the Na atom to generate a spin-dependent potential, which is attractive for the $m = 1$ spin component and repulsive for the $m = -1$ spin component. By abruptly turning off the laser beam placed at the center of the condensate, we create a magnetization pulse wave that is a composite of a density dip of the $m = -1$ component and a density bump of $m = 1$, and we measure its propagation speed in the condensate. The measured propagation speed is compared with that of mass-density wave which is excited in a similar manner with a spin-independent 532 nm laser beam. We find that the propagation speed of spin-density wave is about 20

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