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Spatial variation of interference fringes in a cold atom Sagnac interferometer based on a single large Raman beam SANGKYUNG LEE, TAE HYUN KIM, SIN HYUK YIM, KYU MIN SHIM, Agency for Defense Development — We have developed a cold atom Sagnac interferometer where a $\pi/2-\pi-\pi/2$ Raman pulse sequence is realized by a single large Raman beam. Because the launched atomic cloud is crossing the Raman beam along the radial direction, the sides of the atomic cloud do not satisfy the $\pi/2$ pulse condition and that leads the variation in spatial contrast in the atomic cloud. The time-of-flight measurement performed by the thin probe beams, whose widths are 4 times smaller than the size of the atomic cloud enables analysis of the variation in spatial contrast. We analyzed the contrast as a function of the radial positions and the widths of the spatial selection. With a help of the spatial selection, we achieved the 1.3 times contrast enhancement with respect to the fully integrated contrast. We also discuss the effect of the spatial selection in the angular sensitivity.

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