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Atom Interferometer inside a Hollow-Core Fiber WUI SENG LEONG, ZILONG CHEN, MINGJIE XIN, SHAU-YU LAN, Nanyang Technological Univeristy — Light pulse atom interferometry under free fall is a common tool for gravity measurement at high precision level. However, its sensitivity scales with the size of experimental apparatus and optical power due to the diffraction of the Raman beam used in free space Mach-Zehnder interferometer. One of the solution is to use a waveguide such as single mode hollow-core fiber (HCF) to guide atoms and light simultaneously and perform interferometry in it. In this presentation, I will show the details of Rb^{85} atoms loaded into a hollow-core photonic crystal fiber. Rb^{85} atomic cloud of temperature $\sim 100\mu K$ is prepared above the HCF. It is loaded into HCF by gravity pulling with the aid of a 1mK deep intra-HCF dipole trap. Rabi flopping, Ramsey fringes, and spin echo signal using 3.035 732 439 GHz microwave antenna for the transition $5^2S_{1/2}$ $F = 2$ to $F = 3$ and Raman beams with 1.276(2) GHz red detuned from $F = 3 \rightarrow F' = 2$ and $F = 2 \rightarrow F' = 2$ transition, are also demonstrated. Moreover, I will also show Mach-Zehnder interferometry signal, using $\frac{\pi}{2} - T - \pi - T - \frac{\pi}{2}$ sequence.

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