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Ultracold Potassium for Atom chip based Interferometry SHUANGLI DU, ANDREW ROTUNNO, ANDREW PYLE, SETH AUBIN, The college of William and Mary — We report on progress to cool K to BEC on an atom chip for atom interferometry experiments. We are developing a spin-dependent atom interferometer based on AC Zeeman traps, which will have enhanced sensitivity and spatial resolution. K are well suited for AC Zeeman force. In particular, ^{41}K has a small hyperfine splitting of 254 MHz, which is low enough to enable easy coupling to an atom chip. Also, ^{41}K benefits from suppressed sensitivity to magnetic field noise at 24 G and 45 G. Our apparatus uses an atom chip to trap ultracold atoms 100μm from the chip.This close proximity to the chip ensures that the atoms experience a strong RF and microwave field gradients that are necessary for using AC Zeeman. We have successfully trapped over 3x10^6 atoms at 100μK with a P of 10^{-6}. At present, we are working to cool ^{41}K directly or with Rb. Once the ^{41}K atoms have been cooled to sub-μK levels, or to BEC, then they can be used for interferometry experiments. An interferometer based on ^{41}K BEC is a stepping stone towards the creation of a multi-mode interferometer that can work with ultracold thermal atoms or a degenerated Fermi gas.

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