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Atom chip-based ultracold potassium for microwave and radio-frequency potentials AUSTIN ZILTZ, CHARLES FANCHER, A.J. PYLE, ELANA URBACH, MEGAN IVORY, SETH AUBIN, College of William & Mary —
We present progress on an experiment to manipulate and trap ultracold atoms with microwave and radio-frequency (μ/RF) AC Zeeman potentials produced with an atom chip. These μ/RF potentials are well suited for atom interferometry and spin-dependent trapping for 1D many-body physics studies due to their compatibility with magnetic Feshbach resonances for tuning interactions. Calculations show that μ/RF potentials are expected to significantly suppress the inherent atom chip roughness associated with DC magnetic potentials. We have assembled a dual species, dual chamber apparatus that produces ultracold ^{39}K samples and ^{87}Rb Bose-Einstein condensates on an RF-capable atom chip, with access to other isotopes. On-chip ^{39}K will be sympathetically cooled through the microwave evaporation of rubidium, and transferred to a co-located dipole trap for a series of spatial manipulation experiments to study the capabilities and performance of μ/RF potentials.

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