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Potential Roughness in Atom Chip Microwave and RF Microtraps AUSTIN ZILTZ, SETH AUBIN, College of William and Mary — We present the expected potential roughness of microwave and RF microtraps (u/RF trap)s due to imperfections in atom chip wires. We focus on the theory of atom chip-based u/RF microtraps (u/RF traps) and compare to DC micromagnetic traps. In our u/RF trap geometry, potential roughness is suppressed by selection rules as well as the characteristic shape of the deviations compared to equivalent micromagnetic DC chip potentials. These studies of trap roughness are part of a greater effort to establish u/RF potentials on atom chips. These potentials are inherently conservative, spin-dependent, and allow tunable atom-atom interactions via magnetic Feshbach resonances. They can be used for interferometry of trapped ultracold thermal and quantum gases, atomtronic devices as well as novel trapping and cooling techniques. The small hyperfine splitting of potassium isotopes simplifies the engineering of u/RF potentials, while also providing bosonic and fermionic species.

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