Abstract Submitted
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Zeeman slowing of an atomic beam in a strong, dipolar background field LEO NOFS, ERIC PARADIS, Eastern Michigan University, GEORG RAITHEL, University of Michigan — We have designed a modified Zeeman slower that will be used to source a specialized high-magnetic-field (high-B) atom trap. The trap is a superconducting Ioffe-Pritchard style trap that operates in the Paschen-Back regime (2.0 T3.0 T) and currently works with rubidium [1]. In earlier experiments the trap was loaded using a pyramidal MOT, which had an atomic flux of $10^7 s^{-1}$. We aim to replace the MOT with a Zeeman slower, to increase the atom flux by a factor of 1000 or more. The resultant increase in atom and plasma densities in the high-B trap will allow us to study phenomena in dense, cold, magnetized plasmas, such as strong coupling, shock fronts, and collisions. This modified Zeeman slower must incorporate the strong, inhomogeneous bias magnetic field from the high-B trap. We have created a model which generates a set of solenoids (using current, length, and thickness as parameters). This model includes an optimization algorithm to obtain the best fit for the targeted field profile. This design uses the modular nature of the solenoids to allow for the slowing and trapping of either rubidium or strontium by applying separate sets of optimized current values. This Zeeman slower design also allows for operation with or without the high-B bias field.
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