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An apparatus for laser-cooling and trapping potassium with reduced magnetic field fluctuations[1] WILLIAM TAVIS, JONATHAN WRUBEL, KELLAN KREMER, MATT BEAUCHEM, Creighton University — We describe our apparatus for laser-cooling potassium-39 and potassium-41 at Creighton University, which is a primarily undergraduate institution. We use a two-dimensional magneto-optical trap (2D MOT) with a push beam loading a 3D MOT. The 3D MOT is formed inside of an octagonal glass cell with a high degree of optical access. The ultimate goal of this apparatus is to study spinor dynamics in a potassium-41 BEC. We describe a number of the critical experimental features including an active feedback system for control and cancellation of magnetic field fluctuations. Our homebuilt proportional-integral-derivative circuit reduces the magnetic field noise by up to a factor of 100 from dc through 1 kHz.

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