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Constructing a Magneto-Optical Trap for an Atomic Interferometer[1] DALLAS AKINS, DENNIS UGOLINI, Trinity University — Recent observations have revealed that the Universe is expanding at an accelerating rate! The source of this acceleration has been dubbed "dark energy." If there are different densities of dark energy within the universe we can detect them using an atomic interferometer. The first stage of developing an atomic interferometer is constructing a magneto-optical trap (MOT) to capture atoms. The MOT consists of four key components: a source of cesium atoms, two coil magnets that position the atoms, two lasers that suppress atomic motions, and a vacuum system to house it all. In this talk I will describe the construction of the coil magnets and tunable lasers for our cesium atom MOT. The magnetic field is generated by two 150-turn coils with opposite currents. The laser diode emits a range of frequencies, but the atoms require a specific frequency for trapping. A diffraction grating is used to pick off a single frequency based on the grating's angle from and distance to the laser diode. This distance is adjusted with a piezoelectric transducer (PZT) on which the grating is mounted. With these elements and the vacuum system complete, all that remains is to find a practical cesium source and finish the optical layout.

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