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Towards deployable atomic gravimeters for geophysics ZACHARY PAGEL, XUEJIAN WU, BOLA S. MALEK, JORDAN DUDLEY, PHILIP CANOZA, HOLGER MULLER, Univ of California - Berkeley — Many types of gravimeters are used in geophysics for gravity surveying, mineral prospecting, seismology and natural disaster monitoring. Atomic gravimeters use matter-wave interferometry, and are more accurate and have better long-term stability than gravimeters based on springs, superconducting coils or falling cubes. Since current atomic gravimeters are too complicated to operate outside a well-controlled laboratory, we have implemented an atom interferometer using only one laser diode and a pyramidal mirror, allowing for the instrument to be simple, compact and transportable. The pyramidal mirror is used to create a magneto-optical trap (MOT), and this reduces the number of incident laser beams on the MOT region to a single retro-reflected beam. Operating as a gravimeter, we have achieved sensitivities of $6 \text{ m/s}^2/\sqrt{\text{Hz}}$. To ensure better transportability and reliability, we are developing an upgraded pyramid-based atomic gravimeter. Our simple and transportable design will open up applications in geodesy and geology.

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