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Towards macroscopic-scale atom interferometry with strontium NATASHA SACHDEVA, KENNETH DEROSE, TEJAS DESHPANDE, JONAH GLICK, JAYAMPATHI KANGARA, YIPING WANG, TIMOTHY KOVACHY, Northwestern University — Light-pulse atom interferometry is a versatile and powerful tool for conducting precise measurements of fundamental constants, testing general relativity, searching for signatures of new physics, and investigating quantum mechanics on a macroscopic scale. For atom interferometry, pulses of light are used to create the atom optics equivalents of beam-splitters and mirrors. Recent advances in atomic clocks have illustrated the advantages of using strontium, an alkali-earth atom over the typically used alkali atoms. We present progress toward the realization of a two-meter atomic fountain at Northwestern University and discuss the advanced atom optics techniques and noise mitigation strategies that enable large spatial separations of atomic wave packets and sensitive phase detection. Prospects for future gravitational measurements using this apparatus will also be discussed.

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