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MAGIS-100: Fundamental Science with Atom Interferometry<sup>1</sup> BENJAMIN GARBER, SAMUEL CARMAN, Department of Physics, Stanford University, Stanford, California 94305, USA, YIJUN JIANG, MEGAN NANTEL, Department of Applied Physics, Stanford University, Stanford, California 94305, USA, JAN RUDOLPH, HUNTER SWAN, THOMAS WILKASON, JASON HOGAN, Department of Physics, Stanford University, Stanford, California 94305, USA, MAGIS COLLABORATION — MAGIS-100 is an atom interferometric sensor over a vertical baseline of 100 m currently under construction at Fermilab. By implementing clock atom interferometers at either end of this baseline, MAGIS-100 will be sensitive to potential signatures of ultralight dark matter with scalar and vector couplings. Additionally, by measuring the light travel time along the baseline, MAGIS-100 will serve as a pathfinder for a gravitational wave observatory in the mid-band, with frequencies from 0.1-1 Hz. With free-fall times up to nine seconds, MAGIS-100 will test quantum superposition at macroscopic scales of length (meters) and time (seconds). We present the science goals of the MAGIS-100 instrument and designs for its vacuum, magnetic, and laser systems.

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