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# Novel Light Field Imaging for the MAGIS-100 Experiment

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Long-baseline atom interferometry presents an exciting opportunity for DOE to develop a new program of research in quantum atomic sensors for ultralight dark matter and mid-band gravitational waves. The development and science exploitation of long-baseline atomic experiments promises an ambitious long-term research program at the intersection of the energy, cosmic, and quantum information frontiers, complementing the physics potential of colliders and other dark matter experiments. Scaling existing atom interferometers to terrestrial 100m and kilometer-scale and space experiments will require investment over the next 10 years to support design studies for the next generation of experiments and to develop the core technologies required to achieve the science goals. National Laboratories will be critical to achieve this scale. The MAGIS-100 experiment, now under construction at Fermilab, will be the first large-scale quantum sensor of its kind in the US. This contribution will present a high-level introduction to MAGIS-100 and focus on the design of a novel tomographic imaging system: a Super-aperture 3-Dimensional (3D) light-field imaging device. The system is designed to maximize the total light collection by capturing a larger solid angle of light than a conventional lens with equivalent depth of field. This is achieved by populating a plane of virtual objects using mirrors and fully utilizing the available field of view and depth of field.

## Early Career

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