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AMEGO: Dark Matter Prospects

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The era of precision cosmology has revealed that $\sim 80\%$ of the matter in the universe is dark matter. Two leading candidates, motivated by both particle and astro-physics, are Weakly Interacting Massive Particles (WIMPs) and axionlike particles (ALPs), both of which have distinct gamma-ray signatures. The Fermi Large Area Telescope (Fermi-LAT) Collaboration continues to search for WIMP and ALP signatures spanning the 50 MeV to >300 GeV energy range in dwarf spheroidal galaxies, galaxy clusters, pulsars, the Galactic center, and a variety of other astrophysical targets. Thus far, Fermi-LAT has not conclusively detected a dark matter signature. There is however an intriguing excess of gamma rays associated with Galactic center (GCE). The poorer angular resolution of the LAT at lower energies makes source selection challenging and the true nature of the detected signal remains unknown. Identifying whether the GCE excess is a dark matter signature, a population of astrophysical point sources, or a combination of the two, requires higher resolution observations. ALP searches would also greatly benefit from increased angular and energy resolution at lower energies. To address these, we are developing AMEGO, the All-sky Medium Energy Gamma-ray Observatory. It has a projected energy and angular resolution that will increase sensitivity by a factor of 20-50 over previous instruments. This will allow us to explore new areas of WIMP and ALP parameter space and provide unprecedented access to the particle nature of dark matter. I will present an overview of the AMEGO dark matter search strategy as well as sensitivity projections.

Authors: MEYER, Manuel (Stanford University); CAPUTO, Regina (GSFC/UMCP)

Presenter: MEYER, Manuel (Stanford University)

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