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The DArk Messenger Searches at an Accelerator Experiment, A Case of a Table-Top Scale Experiment at a Beam Dump

DAMSA (**DA**rk **M**essenger **S**earches at an **A**ccelerator) is a table-top scale, extremely-short-baseline experiment designed to probe dark-sector particles (DSPs) that serve as portals between the visible sector and the hidden dark-matter sector. These particles, such as axion-like particles (ALPs), can decay into two photons or e^+e^- pairs. DAMSA is specifically optimized to explore regions of parameter space that are inaccessible to past and current experiments, by operating at ultra-short baselines and employing high-resolution calorimetry, precision timing, and precision tracking in a magnetic field with suppression of beam-related neutron backgrounds.

The experiment can be integrated into facilities such as CERN's Beam-Dump Facility (BDF), operating concurrently with the SHiP experiment, and provides complementary sensitivity in the MeV to GeV mass range. DAMSA represents a cost-effective and timely opportunity to expand CERN's discovery potential in dark-sector physics. It exemplifies how innovative, small-scale experiments can effectively complement large-scale experiments, taking advantage of existing and future infrastructure.

Authors: KIM, Doojin; Prof. YU, Jaehoon (University of Texas at Arlington (US)); ESTRADA VIGIL, Juan Cruz; ESTRADA, Juan; YANG, Un Ki (Seoul National University (KR))