

Abstract Submitted
for the APR17 Meeting of
The American Physical Society

The Advanced Particle-astrophysics Telescope (APT) Mission Concept¹ JAMES BUCKLEY, Washington Univ — The Advanced Pair Telescope (APT) is a concept for a probe-class gamma-ray mission aimed at two primary science objects: (1) providing sensitivity to thermal-WIMP dark matter over the entire natural range of annihilation cross-sections and masses and (2) identifying short GRBs or gravity wave sources by detecting and localizing MeV gamma-ray transients. The instrument combines a pair tracker and Compton telescope in one simple monolithic design. By using scintillating fibers for the tracker and wavelength-shifting fibers to readout CsI detectors, the instrument could achieve an order of magnitude improvement in sensitivity compared with Fermi at GeV energies, and several orders of magnitude improvement in MeV sensitivity compared to Comptel. The instrument would have roughly the same number of electronic channels as Fermi, but would provide an effective area of 12m^2 , and a geometry factor of $100\text{ m}^2\text{sr}$. The same CsI detectors used in the tracker/Compton telescope could be used for detection of high-energy transition radiation for measurements of light cosmic-ray abundances, making this a multi-purpose astro-particle physics observatory. The instantaneous all-sky sensitivity would provide a capability almost unique over the entire electromagnetic spectrum, providing a critical component of multi-messenger studies of the universe.

¹We acknowledge support from the Washington University McDonnell Center for the Space Sciences.

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Date submitted: 30 Sep 2016

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