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# Particle tracking at cryogenic temperatures: The Fast Annihilation Cryogenic Tracking (FACT) detector for the AEgIS antimatter gravity experiment

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The AEgIS experiment at Cern is an interdisciplinary collaboration between atomic, plasma and particle physicists, with the scientific goal of performing the first direct measurement of the Earth's gravitational acceleration on antimatter. The principle of the experiment is as follows: cold antihydrogen atoms are synthesised in a Penning-Malberg trap and are Stark accelerated towards a moire deflectometer, the classical counterpart of an atom interferometer, and annihilate on a position sensitive detector. Crucial to the success of the experiment is an antihydrogen detector that will be used to demonstrate the production of antihydrogen and also to measure the temperature of the anti-atoms and the creation of a beam. The operating requirements for the detector are very challenging: it must operate at close to 4K inside a 1T solenoid magnetic field and identify each of the annihilation vertices of the hundred or so antihydrogen atoms that are produced during the 1ms period of antihydrogen production. Our solution - called the FACT detector - is based on a novel multi-layer scintillating fiber tracker with SiPM readout and an FPGA based readout system. This talk will present the design of the FACT detector and detail the operation of the detector in the context of the AEgIS experiment.

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