

## Detection of antihydrogen – A Vertexing Detector overview for the ALPHA

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The aim of the ALPHA experiment at CERN is to trap cold atomic antihydrogen, study its properties, and ultimately to perform precision comparison between the hydrogen and antihydrogen atomic spectra. Recently the collaboration has reached important milestones beginning with demonstrating the ability to trap and confine neutral cold antihydrogen [1][2], setting new limits on the charge of antihydrogen [3], and performing spectroscopic measurements of antihydrogen [4][5].

The principle tool for antihydrogen detection in the ALPHA experiment is a Silicon Vertex Detector (SVD) composed of 72 double-sided silicon strip hybrid modules designed to surround the neutral atom trap. Recently upgraded [7], the SVD is used to image single annihilation events, and reconstruct spatial and timing data of antiproton annihilations. The detector performance can be optimised for various physics applications. This ranges from extreme low background suppression for counting experiments, to high signal acceptance and accurate vertex reconstruction used for collective plasma behaviour studies, giving insight into the formation processes of antihydrogen.

A description of the SVD performance, characteristics, and an overview of applications in the ALPHA experiment will be given. The presentation will cover a summary of recent results, improvements to analytical methods leading to near order of magnitude reduction in background signal and outlook for probing antihydrogen formation.

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