Contribution ID: **318** Type: **Poster**

# Vertex Reconstruction for Studying Antiproton-Nucleus Annihilations

*Wednesday 19 February 2025 11:10 (20 minutes)*

As antimatter is mostly detected through its annihilation, the antiproton-nucleus ($\bar{p}$A) interaction is a crucial process. Various models, compared mostly to older data from experiments at LEAR, show deviations from measurements by large factors, indicating that, despite its significance, the annihilation mechanism is not well established.
A study of $\bar{p}$A annihilations at rest on a variety of thin solid targets is being set up at the ASACUSA facility, for which a dedicated beamline for the slow extraction of 250 eV antiprotons has already been put into operation. The experiment will use seven Timepix4 ASICs coupled to 500 um silicon sensors arranged in a cuboid geometry that covers the majority of the full solid angle around the target. Using these novel chips, the total multiplicity, energy, and angular distribution of various prongs produced in a number of thin solid targets can be measured.
A 3D reconstruction algorithm for the annihilation vertex from particle tracks in the single-plane detectors has been developed using Monte Carlo simulations. Therefore individual annihilation events can be reconstructed, allowing the discrimination between antiprotons annihilating on the target and those elsewhere.
The measurements will also enable a study of possible final state interactions triggered by the primary annihilation mesons, as well as their evolution with the nucleus mass and their branching ratios.

## Primary experiment

ASACUSA

**Author:** KRAXBERGER, Viktoria (Austrian Academy of Sciences (AT))

**Presenter:** KRAXBERGER, Viktoria (Austrian Academy of Sciences (AT))

**Session Classification:** Coffee & Posters B

**Track Classification:** Semiconductor Detectors