Contribution ID: **135** Type: **not specified**

# Study of Low Energy Antiproton Annihilations on Nuclei

*Tuesday 27 August 2024 17:30 (2 hours)*

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 employ new technologies, such as the Timepix4 ASICs coupled to silicon sensors, to measure the total multiplicity, energy, and angular distribution of various prongs produced in a number of thin solid targets. A detection system consisting of seven Timepix4, covering most of the solid angle, is being constructed. Additionally, a 3D reconstruction algorithm for the annihilation vertex from particle tracks in the single-plane detectors has been developed using Monte Carlo simulations. Individual annihilation events can be reconstructed with a resolution of ˜1 mm, allowing 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. The results will be used to assess and potentially improve various simulation models, such as the Liège Intranuclear Cascade model and FLUKA.

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

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

**Session Classification:** Poster