Contribution ID: **37**   Type: **Experimental Nuclear Physics**

A new Silicon Array for CAT-M

Tuesday, 23 August 2022 14:00 (15 minutes)

The active target CAT-M (CNS Active Target - Medium/Manul) is being used in an experimental campaign for the study of the ISGMR (Isoscalar Giant Monopole Resonance), also called "Breathing Mode".

The experimental campaign is performed at HIMAC (Heavy Ion Medical Accelerator in Chiba), and beam time has been assigned to three different measurements. The first two experiments have been successfully carried out: the nucleus of ^{136}Xe was studied in July 2021, and the nuclei of ^{80,86}Kr in February 2022. Data are currently under analysis at RCNP.

The apparatus was improved in order to maximize the detection performance of the active target. In particular, two major upgrades will be described in this presentation which consist in the introduction of a dipole magnet inside the active target field cage, and the installation of a new silicon array on CAT-M lateral flanges (next measurement).

In the past experiments the magnet was placed inside the field cage in order to reduce the noise coming from the delta rays generated by the high-energy beam crossing the active region. Electrons resulting from the interaction of the beam with the gaseous target are confined in a thin region along the beam direction, and will not interfere with the tracking process. This is the first time a magnet was used inside an active target field cage, and the noise suppression was significant: tracks are clearly identifiable, and total trigger rate drastically reduced.

The next measurement will take place in September 2022, and the lateral flanges of CAT-M will host the DSSSD (Double-Sided Silicon Strip Detectors) array of Leuven. This array is composed by twelve Si detectors of 10cm x 10cm surface, segmented in 64 strips and with a thickness of 1000μm. It will not only guarantee a large coverage of the solid angle and a good energy resolution ($\sim$0.5% @5MeV), but also a better position sensitivity given by the high-density readout strips.

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Session Classification: Young Scientist Session 3