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The Cryogenic AntiCoincidence detector for the ATHENA X-IFU instrument: results from the design performed by GEANT4 simulation, and characterization of the new single pixel prototype as basic-element of the final 2x2 array.

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The ATHENA observatory is the second large-class ESA mission, in the context of the Cosmic Vision 2015-2025, scheduled to be launched on 2028th at L2 orbit.
One of the two planned focal plane instruments is the X-IFU (X-ray Integral Field Unit) which will be able to perform simultaneous high grade energy spectroscopy and imaging over the 5 arcmin FoV by means of a kilo-pixels TES-based array coupled to a high-quality X-ray optics.

The X-IFU sensitivity is degraded by the particle background which is induced by primary protons of both solar and Cosmic rays origin, and secondary electrons.

A Cryogenic AntiCoincidence (CryoAC) TES-based detector, put < 1 mm below the TES-array, will allow the mission to reach the background level that enables its scientific goals. It is a 4-pixels detector made of Silicon absorbers sensed by Iridium TESes. At present our prototyping road defines at the single pixel level a TRL = 3-4. We have designed and developed two further prototypes in order to reach TRL = 4.

The design of the CryoAC, in particular how its area affects the residual particle background on the TES-array, has been also optimized using the GEANT4 simulation tool.

Here will be presented some results from the GEANT4 simulations enabling the homogenization of the residual particles backround along the TES-array area, and the preliminary testing activity and results from the first of the two detectors, 1 cm^2 area, made of 65 Ir TESes.