

A New Scatterer Detection System for a Compton CubeSat telescope aboard the ComPol project

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In the last decades, the use of Compton telescopes has greatly increased in astronomy. Compton telescopes are designed to perform X-ray and γ -ray polarimetry of celestial bodies like neutron stars, quasars, supernova remnants and binary black holes. In this context, the ComPol project involves the implementation of a Compton telescope in a 1U CubeSat nanosatellite to perform polarimetric analysis of the Binary Black Hole (BBH) system known as Cygnus X-1. The payload consists of two detection systems arranged in a stacked fashion: 1) the scatterer based on Silicon Drift Detector (SDD) arrays and 2) the absorber based on a scintillating crystal integrated with matrices of Silicon Photomultiplier (SiPM). This paper presents the first layer design of the Compton telescope for photons experiencing Compton scattering. The analog readout chain consists of two 7-pixel SDD arrays, four CUBE preamplifiers and SFERA ASIC Analog Pulse Processor (APP). At the end of the chain, FPGA technology is employed to handle data signal flow between SFERA and PC. This paper presents the prototype system consisting of three boards: ICARO, intended to house detectors and preamplifiers, SFERA L-like carrier, which houses the APP chip, and ENOS, which implements the FPGA module and BIAS section of ICARO. At the conference, the results of tests performed with the final flight module will be presented.

Summary

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