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THE DEVELOPMENT OF MICRO-ROSI - MICRO ROENTGEN SATELLITE INSTRUMENT

Abstract

The μ ROSI miniature x-ray telescope is the first x-ray telescope specifically designed for an amateur micro satellite. Its mission is to perform an all-sky survey in the soft x-ray band on board the Italian satellite Max-Valier. Due to the limitations imposed by the small size of the spacecraft, the instrument features a silicon drift detector (SDD) with very low power consumption and a focusing optics that consists of 12 nesting mirror shells. With a field of view of 1° μ ROSI will perform an all-sky survey flying in sun-synchronous orbit (SSO).

This paper describes the overall telescope design and gives an overview of all major components and subsystems. All subsystems have been tested with flight-like engineering models. The results of these tests are presented in this paper.

The silicon drift detector of the μ ROSI telescope has been tested with a breadboard electronics and the engineering model of the electronics is currently being manufactured.

One demonstrator mirror shell has been produced and tested in the PANTER x-ray test facility to verify the x-ray properties.

A structural qualification model has been built and tested with mass dummies. It showed sufficient load capability to sinusoidal, random vibration and shock loads.

One key element of the thermal control subsystem for the detector is a latent cold storage which operates at -16°C to guarantee an optimal operating temperature for the SDD. The selected phase change material has been tested successfully in a vacuum chamber.