

TERZINA on-board NUSES: a pathfinder for EAS Cherenkov Light Detection from space

Friday, 7 October 2022 10:50 (20 minutes)

UHECRs above 100 PeV might be detected from space by a mission pointing to the Earth limb when optical emission from extensive air showers is produced. Space-born detection might also play a relevant role in the multi-messenger field if detection of Earth skimming neutrinos will be ensured. The validation process for this detection of rare UHE events goes through precursors as the NUSES space mission, designed to be operated in a Sun synchronous, quasi-polar, low Earth orbit. On board the satellite platform, developed by TAS-I, there will be two payloads: TERZINA, discussed in this contribution, and ZIRE', devoted to low energy cosmic and gamma rays, space weather, and study of the magnetosphere-ionosphere-lithosphere coupling.

TERZINA is essential for the technological space validation of SiPM with their associated electronics, with a few ns resolution, thus enabling discrimination from the background night glow. It will also validate the optical system and provide background characterization, as well as measuring, for the first time, UHECRs from space, with a rate of hundreds events per year above 100 PeV.

Both scientific and technological outcomes will be very important in the design and optimization of future and bigger missions in the field.

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