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The Terzina Telescope on board the NUSES space mission.

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The NUSES mission acts as a technological pathfinder, hosting a range of cutting-edge instruments for in-orbit detection of cosmic rays, neutrinos, and gamma rays across different energy ranges. Among these, the Terzina instrument stands out as a compact telescope featuring Schmidt-Cassegrain optics, specifically designed to observe Cherenkov radiation produced by Extensive Air Showers (EAS) generated when high-energy cosmic rays (>100 PeV) collide with the Earth's atmosphere. Terzina marks a pivotal step toward the realization of future space-based instruments capable of detecting upward-moving showers, generated by tau-leptons and muons resulting from the interaction of high-energy astrophysical neutrinos with the Earth. This work delves into the technical characteristics, detection capabilities, and scientific potential of the Terzina instrument, underscoring its contribution to advancing high-energy astrophysical observations.

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