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The Camera System for Real-Time Optical Calibration in TRIDENT

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Following the groundbreaking discovery of astrophysical neutrinos by IceCube, TRIDENT has been proposed as a next-generation neutrino telescope, planned for construction at a depth of around 3,500 meters in the Western Pacific Ocean. TRIDENT aims to enhance the search for astrophysical neutrino sources and optimize all-flavor neutrino detection.

As a water-based neutrino telescope, TRIDENT faces unique challenges in optical calibration due to the dynamic and non-uniform optical properties of the deep-sea environment. In this talk, I will present a custom-designed CMOS camera system and its adaptive image processing algorithms for real-time optical calibration, successfully demonstrated in TRIDENT’s Pathfinder experiment in 2021.

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