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3.6 Review of Solid State Photon Counters for Laser Tracking of Orbital Space Debris

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We are reporting on a design, construction and performance of various solid state photon counting detector packages suitable for laser tracking of orbiting space debris. Our group has designed and constructed several solid state photon counters for application in space related projects in the last years. In all these earlier applications the timing resolution, stability and operation at 532 nm wavelength were the key requirements. In contrast to it laser ranging of orbiting space debris requires ultimately high photon detection probability, while the timing parameters are of lower importance. A detector package providing photon detection probability exceeding 70% at 532 nm wavelength has been developed for space debris laser ranging. It is used for this purpose on several SLR stations worldwide. The foreseen new systems for orbiting space debris laser tracking are expected to operate on near infrared wavelengths 1064nm or 1540 nm. We are presenting a review of photon counting detectors candidates for space debris laser tracking.