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Light detection in nEXO liquid Xenon detector. FABRICE RETIERE, TRIUMF, NEXO COLLABORATION — The nEXO experiment is being designed to achieve unprecedented sensitivity to the neutrino-less double beta decay of 136Xenon. Efficient light detection is critical for achieving the energy resolution of 2% (FHWM) or better required for efficient background rejection. Simulations show that such an energy resolution can be achieved if at least 5% of the scintillation photons are detected, which requires mirroring most inactive surface and at least $4m^2$ of single photon detectors. So-called silicon photo-multipliers (SiPMs) are the baseline option for nEXO as they meet or approach all requirements: 1) measured limits for the radio-isotope content of SiPMs are consistent with requirements, 2) the photo-detection efficiency exceeds 15% at the liquid Xenon scintillation wavelength, 3) dark noise and correlated avalanche rates are within specifications. The nEXO collaboration is continuing to work with the SiPM vendors to further improve performances. The nEXO collaboration is also investigating solutions for reading out m^2 of SiPMs, which has not been done before. In addition to conventional analog electronics solutions, the nEXO collaboration is investigating using the 3-dimensionally integrated technology (3D-SiPMs) that completely avoid any analog electronics and provide a mean of tagging every photon with minimum power dissipation. We will report the development of solutions for light detection in nEXO highlighting the technology that are pioneered by the collaboration, in particular 3D-SiPMs.

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