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The Liquid Hydrogen Target for TPEX[1] IEVGEN LAVRUKHIN, WOLFGANG LORENZON, RICHARD RAYMOND, University of Michigan, TPEX COLLABORATION — Significant efforts (both theoretical and experimental) have been made over the past decade to study two-photon exchange (TPE) contributions in elastic lepton-proton scattering. The three recent experiments (VEPP-3, CLAS and OLYMPUS), which have reported on direct measurements of TPE, show little evidence for large contributions of hard two-photon exchange up to $Q^2 = 2.5$ $(GeV/c)^2$. The Two-Photon Exchange eXperiment (TPEX) proposes to determine the hard two-photon contributions by measuring the ratio of positron-proton to electron-proton elastic scattering at beam energies of 2 and 3 GeV. This will extend the momentum transfer range up to $Q^2 = 4.7$ $(GeV/c)^2$, where the TPE effect is expected to be more substantial, while still overlapping with existent OLYMPUS data. For this new experiment, we propose to build a liquid hydrogen target that will yield a luminosity about a factor of 200 times higher than that of the OLYMPUS experiment. This higher luminosity will greatly shorten the run time needed at 2 GeV and help to make up for the lower cross section at 3 GeV beam energies. In this presentation, we will discuss the latest updates on the requirements, technical design and implementation of the liquid hydrogen target for TPEX.

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