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P3.094 Neutrinos from a pion beam line: nuPIL

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A novel configuration for a neutrino beam line that can simultaneously support both long and short baseline experiments is described. The neutrino beams originate from pions that are first focused by a magnetic horn, as in a conventional neutrino beam. However in the case of nuPIL, the horn is followed by a magnetic lattice that is used to select the pion charge and then to transport the pions in a production straight. This produces extremely pure neutrino and anti-neutrino beams, while minimizing the amount of beam power that is transported underground for the long-baseline physics program. This produces a large cost reduction for the civil construction. The principles of the design of nuPIL are presented, together with tracking results and the resulting neutrino flux. The potential of the facility for CP-violation searches in the framework of the DUNE experiment is discussed and compared to the potential of the optimized beam from LBNF.