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High Purity Beam in the TRIUMF M13 CHANNEL CHLOE MALBRUNOT, UBC, TRIUMF, PIENU COLLABORATION — The branching ratio of pion decays $\frac{\Gamma(\pi\to e\nu_e+\pi\to e\nu_e\gamma)}{\Gamma(\pi\to\mu\nu_\mu+\pi\to\mu\nu_\mu\gamma)}$, has provided the best test of the hypothesis of electron-muon universality in weak interactions. The new PIENU experiment at TRIUMF, aiming to improve the precision of the branching ratio measurement by a factor > 5, measures positrons from the two-body decay $\pi^+ \to e^+\nu_e$ ($E_{e^+} = 69.8$MeV) and the $\pi^+ \to \mu^+ \to e^+$ ($E_{e^+} \leq 52.8$MeV) chain. In order to achieve large acceptance, the detector system including a large NaI(Tl) calorimeter is placed on the beam axis. Since this detector configuration is very sensitive to positron contamination in the beam, the TRIUMF low energy pion channel, M13, has been upgraded to reduce by a factor of 100 the number of positrons in the beam (which was 1/3 of the number of pions before upgrade). This presentation will describe the suppression technique based on energy-loss as well as the simulation and test results which confirm that the performance of the upgraded beamline satisfies the requirements of the PiENu experiment. The presentation will also outline the measurement of $\pi^+ \to e^+\nu_e$ decays from the beamline which constitute a source of 100 % polarized positron and provides a new beam channel momentum calibration source.

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