

Progress Update

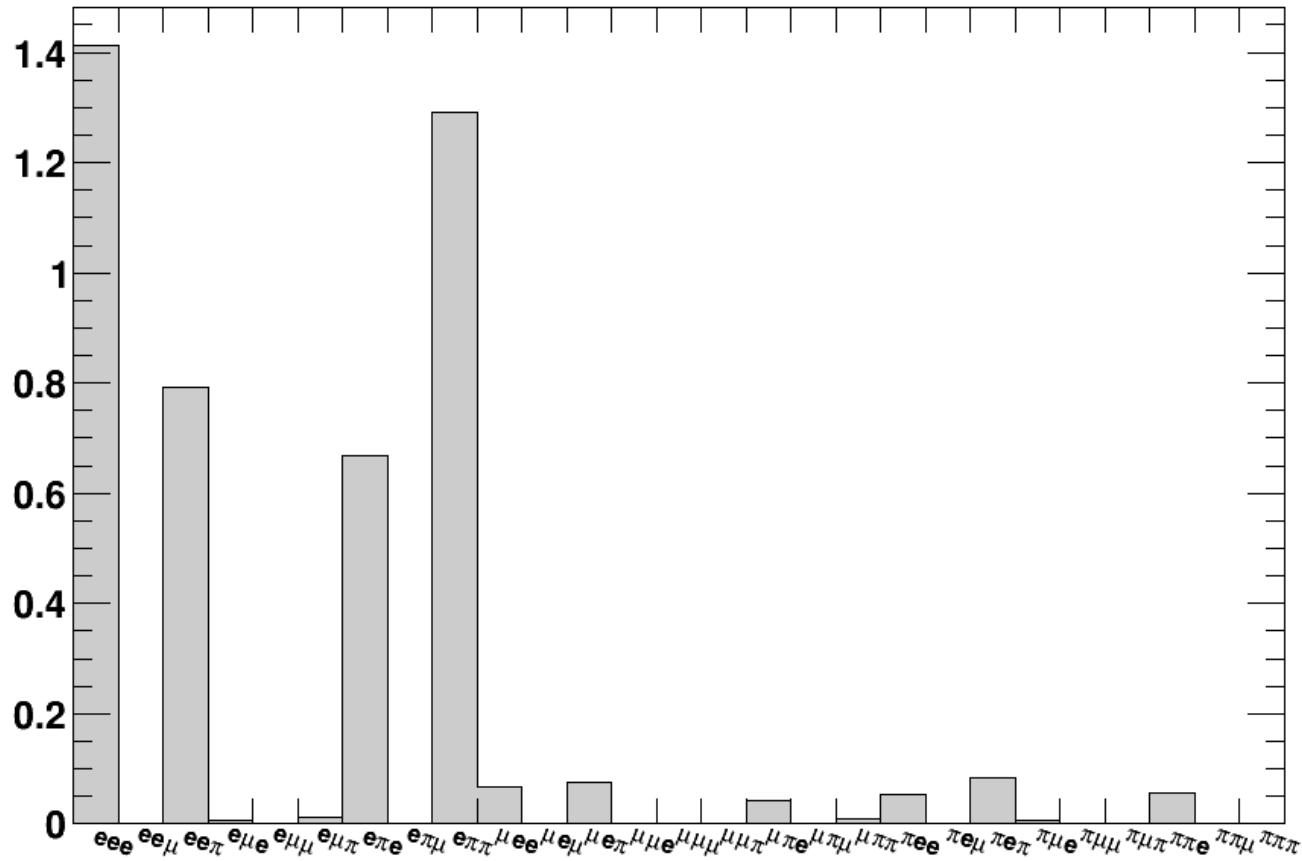
Trevor Towstego
UofT Neutrino/DM Meeting
May 30, 2018

Likelihood Ratios

- Look at likelihood ratios **before 2-ring cut**
 - Showed 1R and 2R likelihoods last week
 - Following slides show 3R likelihoods
 - Not all events have 3R likelihood information

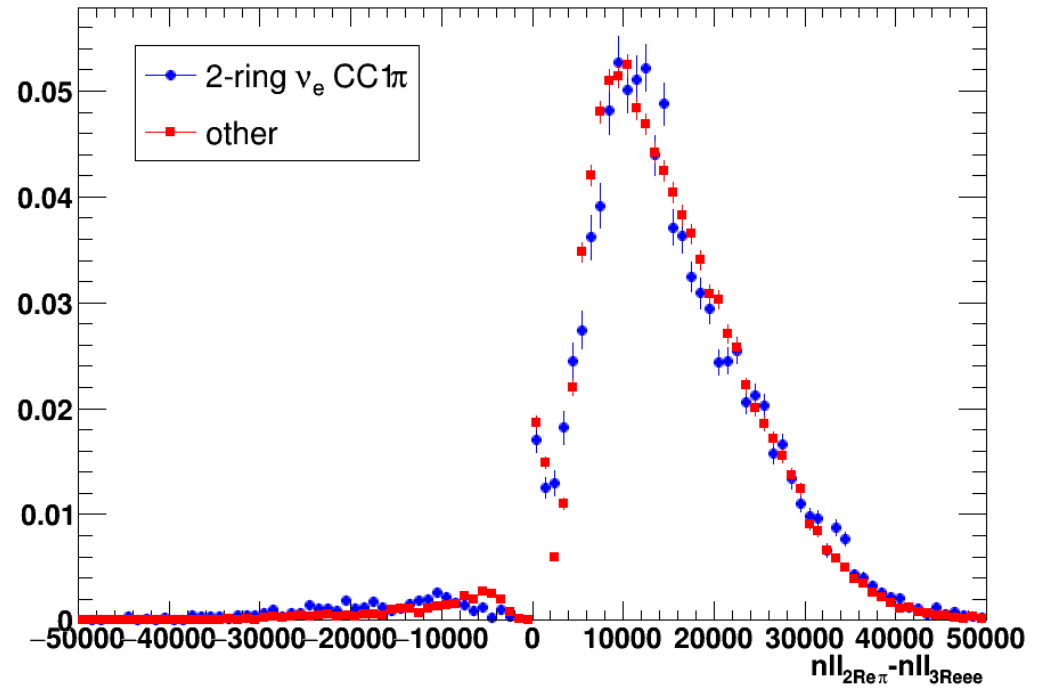
What are 2-ring ν_e CC1 π events being reconstructed as?

3-ring reco PID: true 2-ring ν_e CC1 π

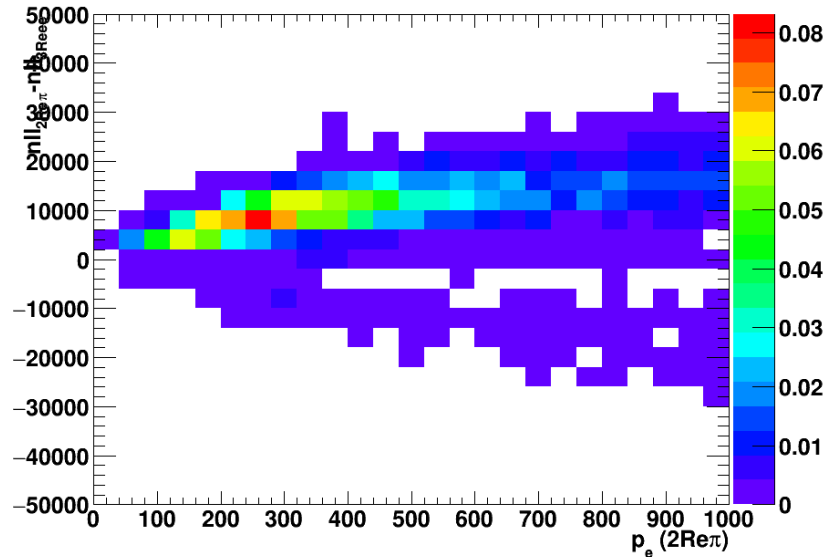


2Re π VS 3Re $\epsilon\epsilon$

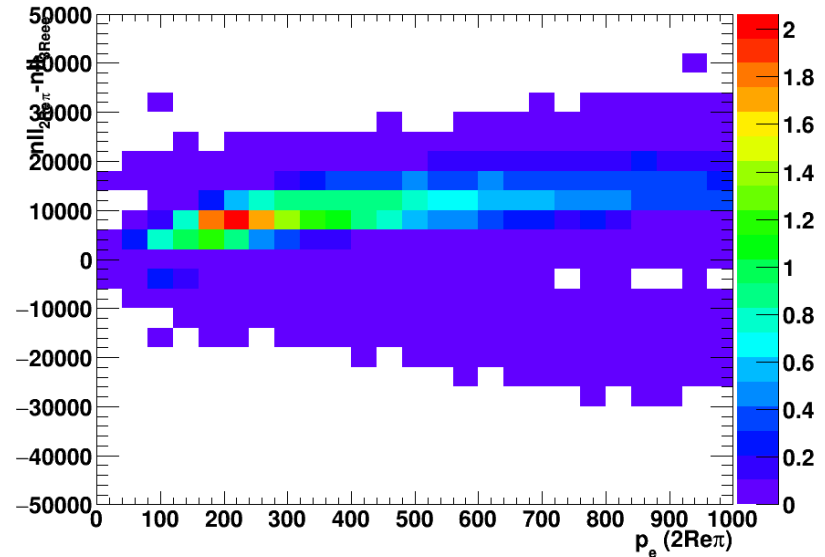
$nI_{2Re\pi} - nI_{3Re\epsilon\epsilon}$: FCFV



$nI_{2Re\pi} - nI_{3Re\epsilon\epsilon}$ vs $p_e(2Re\pi)$: FCFV, 2-ring ν_e CC1 π

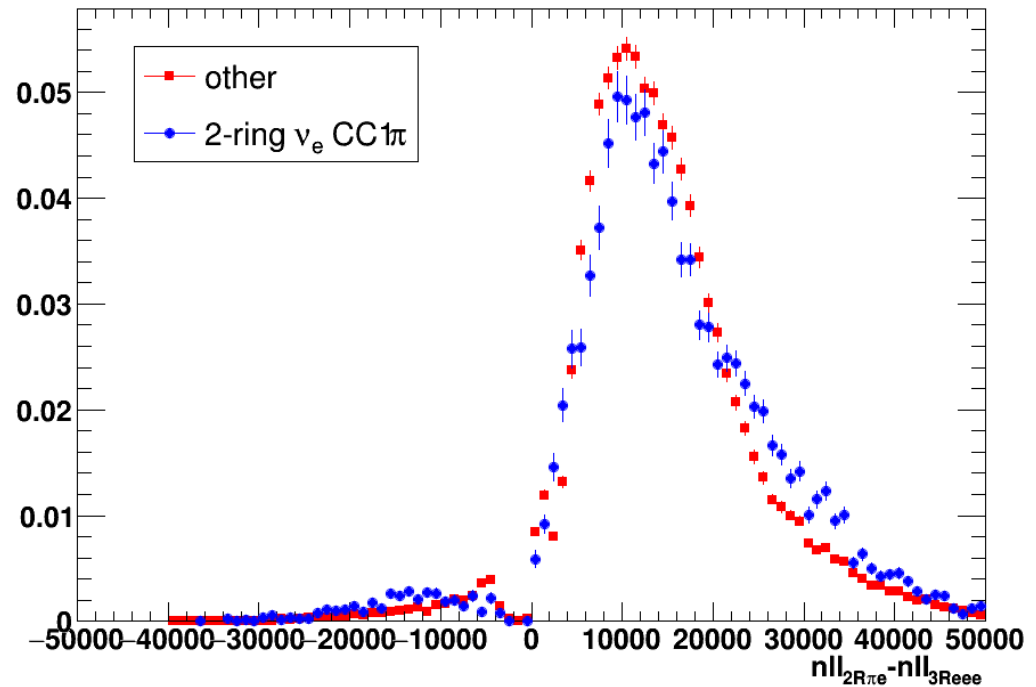


$nI_{2Re\pi} - nI_{3Re\epsilon\epsilon}$ vs $p_e(2Re\pi)$: FCFV, other

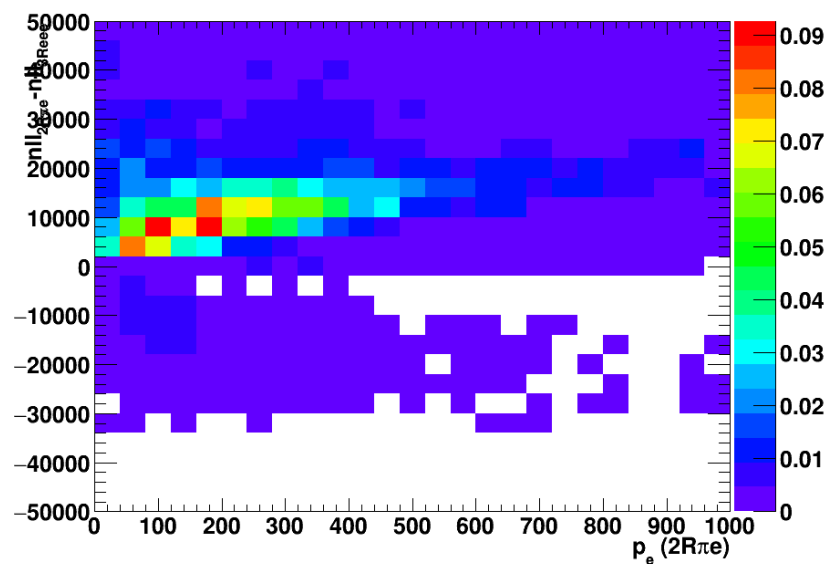


2Rπe vs 3Reee

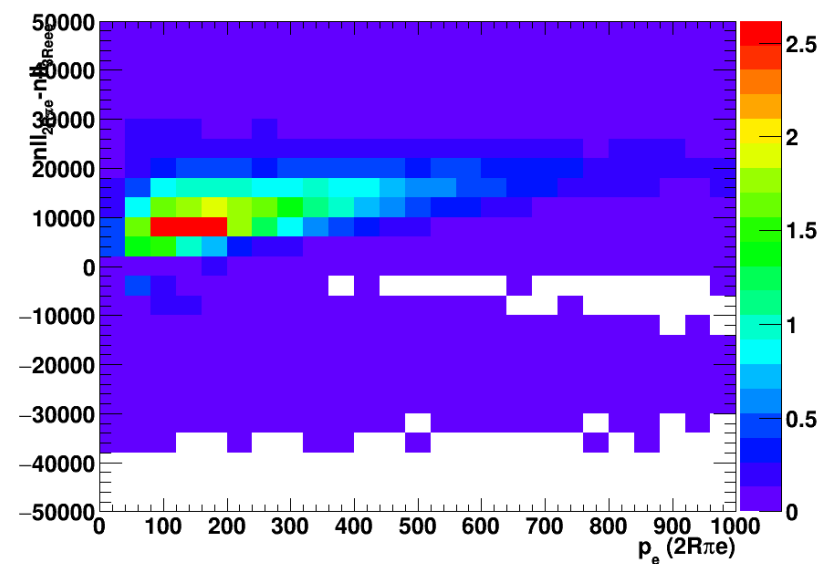
$nI_{2R\pi e} - nI_{3Reee}$: FCFV



$nI_{2R\pi e} - nI_{3Reee}$ vs p_e (2Rπe): FCFV, 2-ring ν_e CC1π

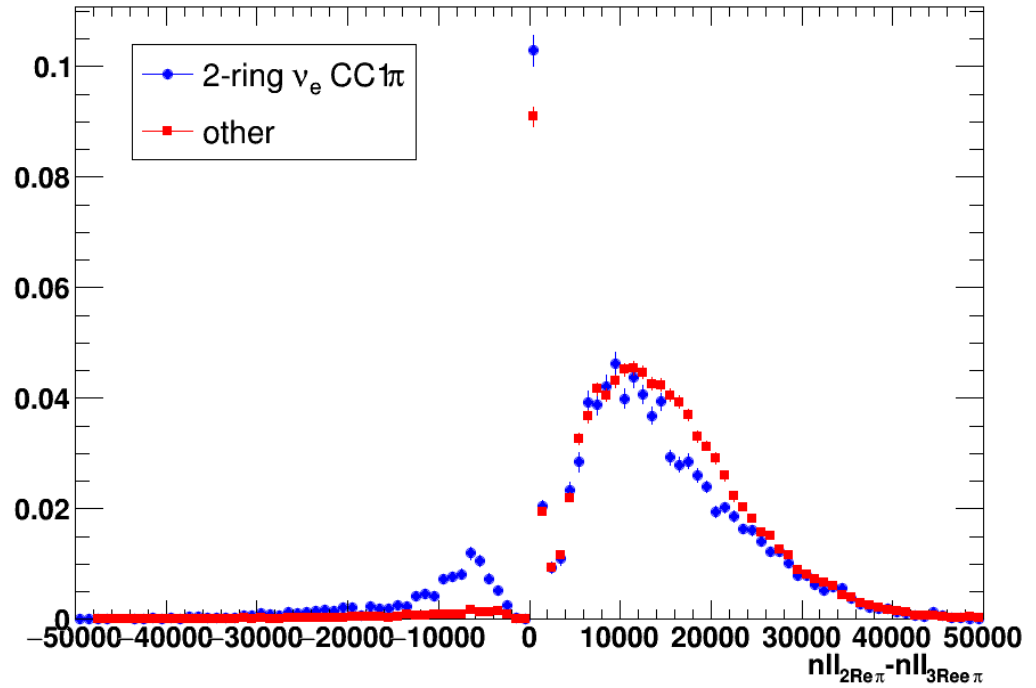


$nI_{2R\pi e} - nI_{3Reee}$ vs p_e (2Rπe): FCFV, other

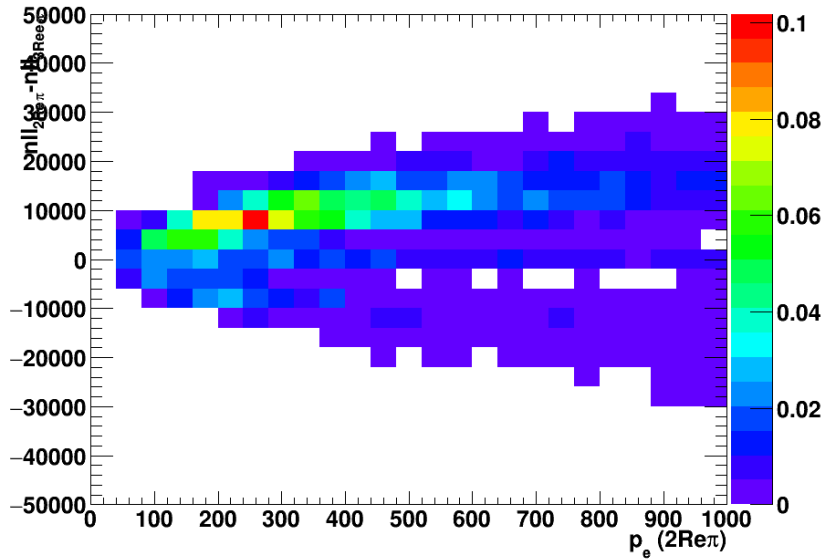


2Re π VS 3Re π

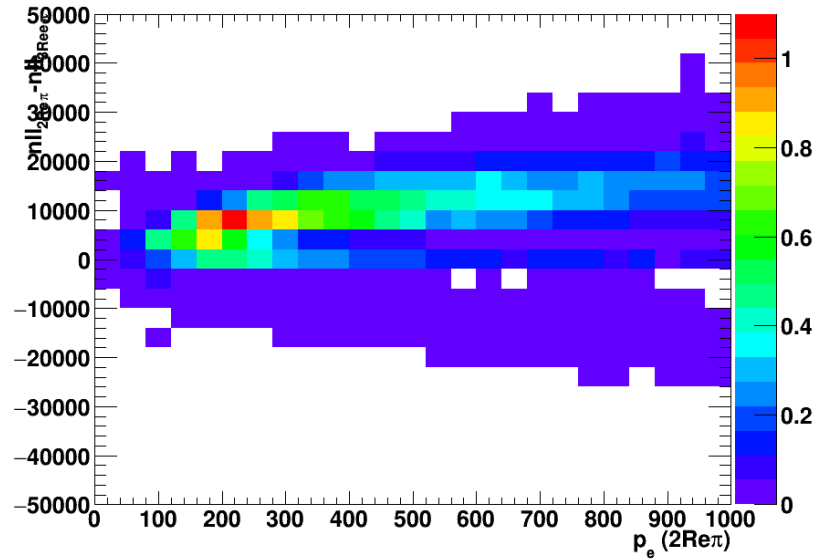
$nll_{2Re\pi} - nll_{3Re\pi}$: FCFV



$nll_{2Re\pi} - nll_{3Re\pi}$ vs $p_e(2Re\pi)$: FCFV, 2-ring ν_e CC1 π

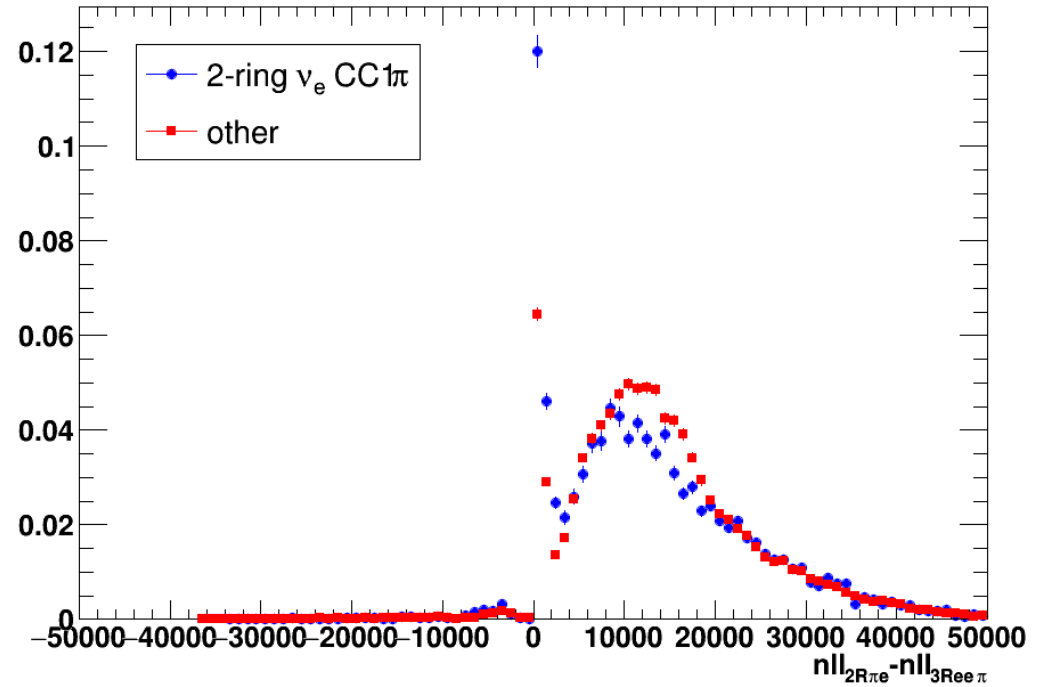


$nll_{2Re\pi} - nll_{3Re\pi}$ vs $p_e(2Re\pi)$: FCFV, other

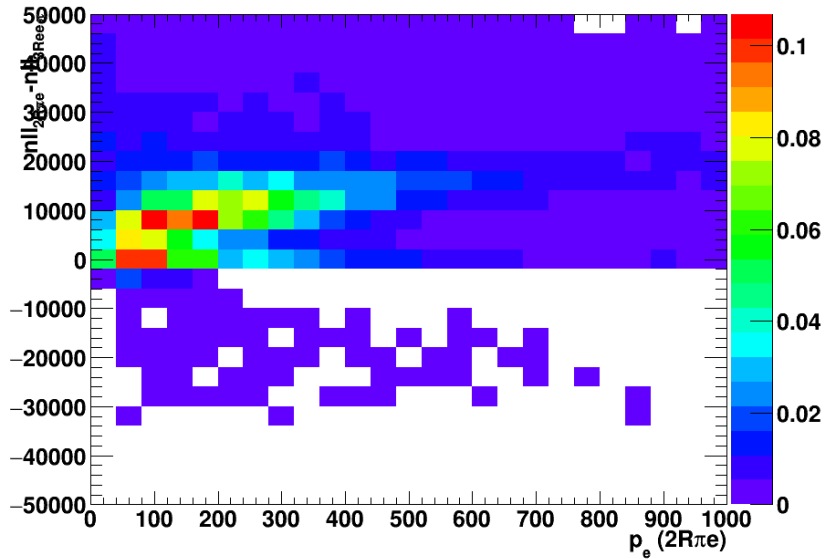


2R πe vs 3R $e e \pi$

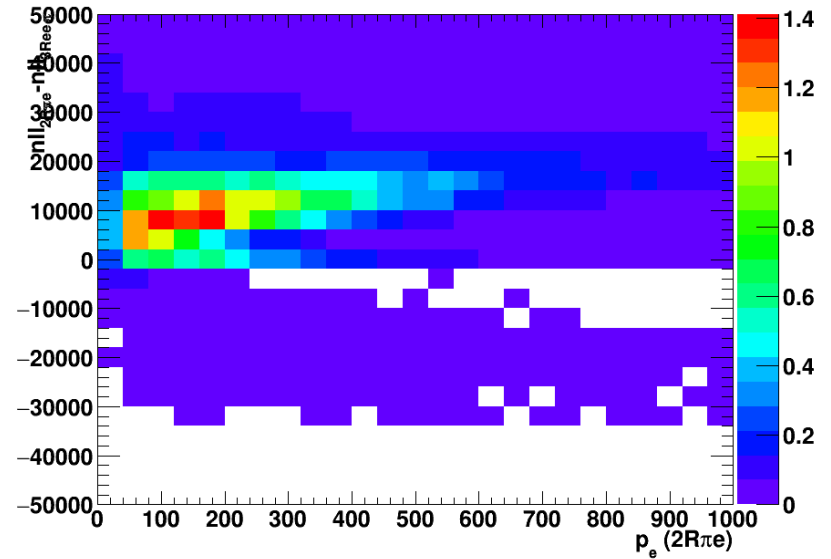
$nI_{2R\pi e} - nI_{3Ree\pi}$: FCFV



$nI_{2R\pi e} - nI_{3Ree\pi}$ vs p_e (2R πe): FCFV, 2-ring ν_e CC1 π

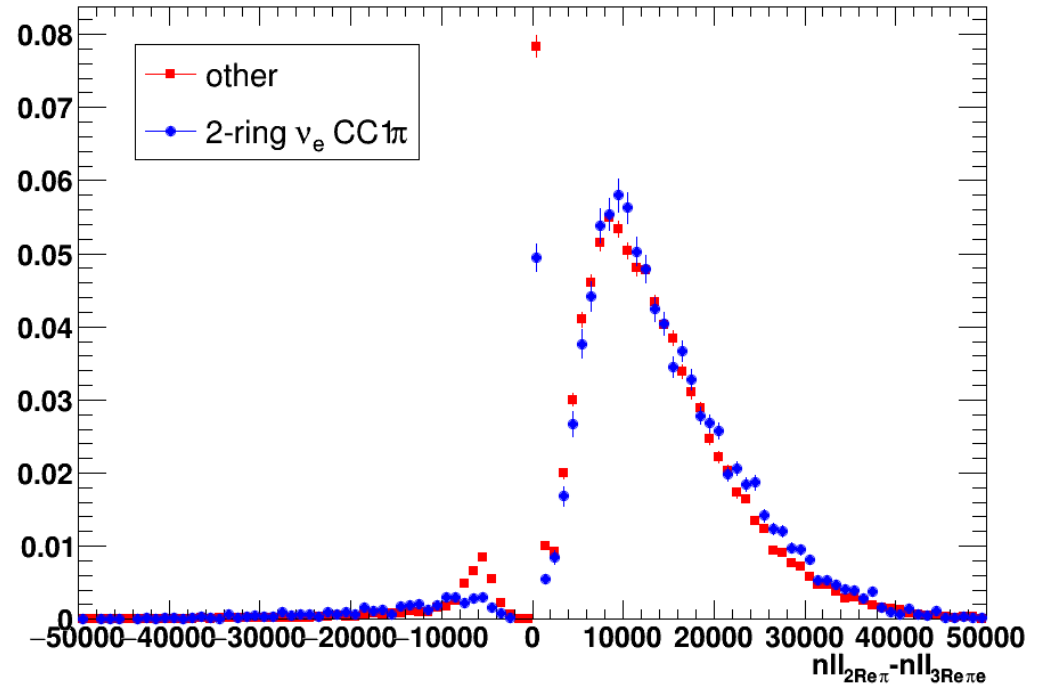


$nI_{2R\pi e} - nI_{3Ree\pi}$ vs p_e (2R πe): FCFV, other

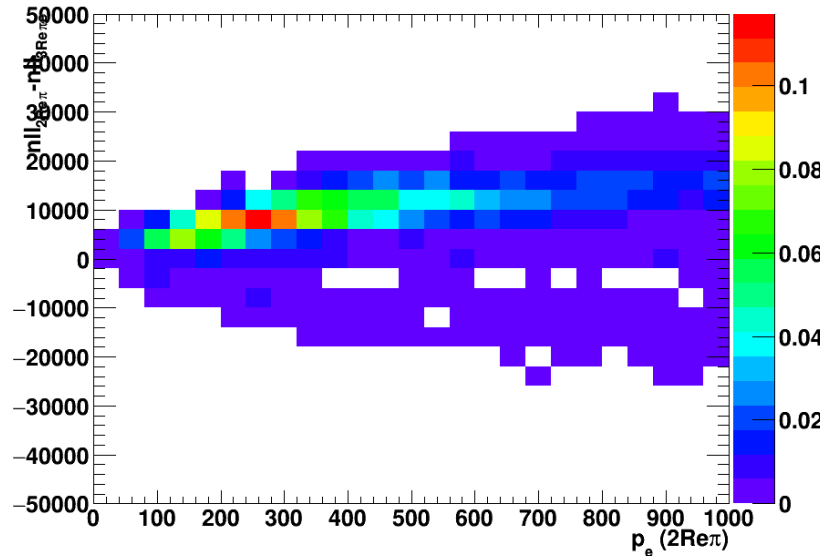


2Re π VS 3Re π e

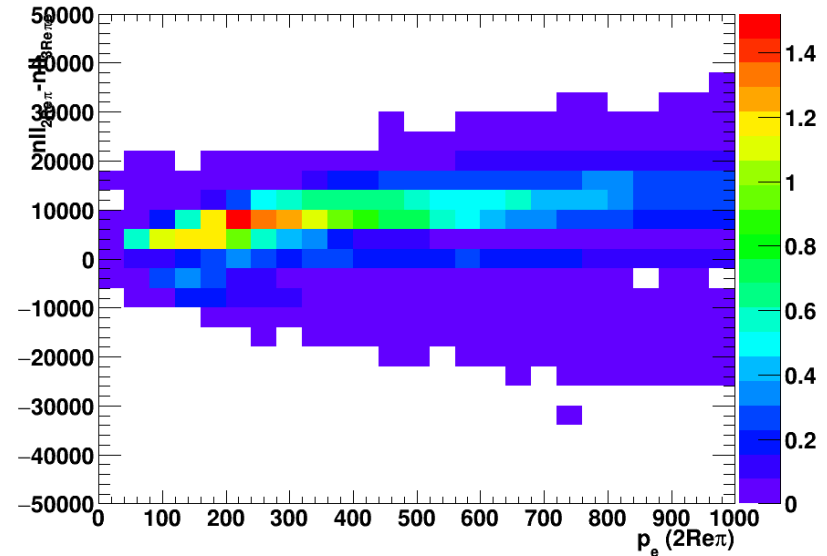
$nl_{2Re\pi} - nl_{3Re\pi} : FCFV$



$nl_{2Re\pi} - nl_{3Re\pi}$ vs $p_e (2Re\pi) : FCFV, 2\text{-ring } \nu_e CC1\pi$

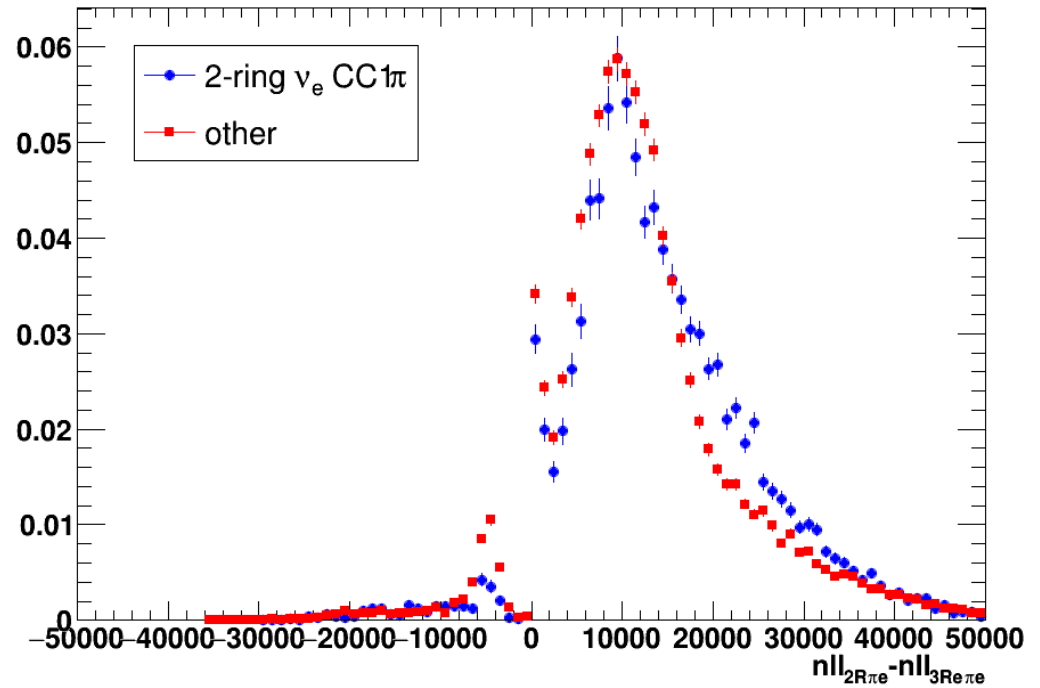


$nl_{2Re\pi} - nl_{3Re\pi}$ vs $p_e (2Re\pi) : FCFV, other$

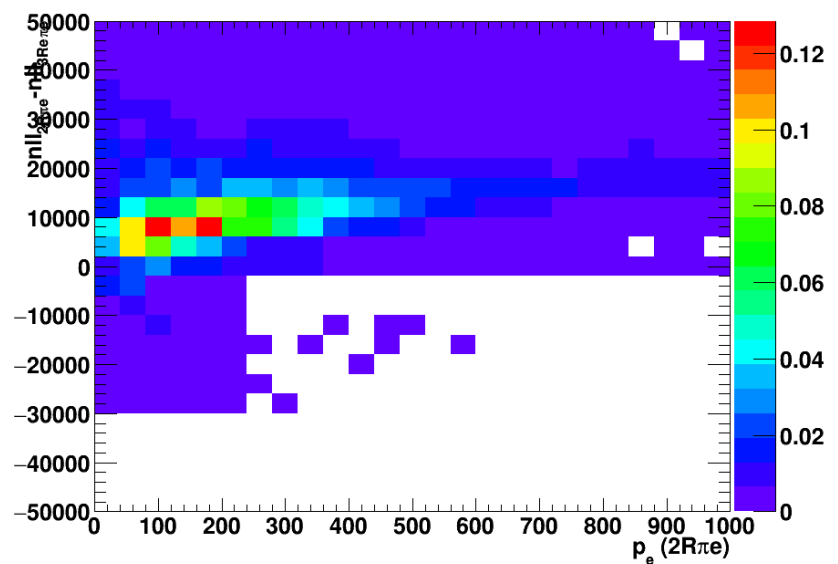


2Rπe VS 3Reπe

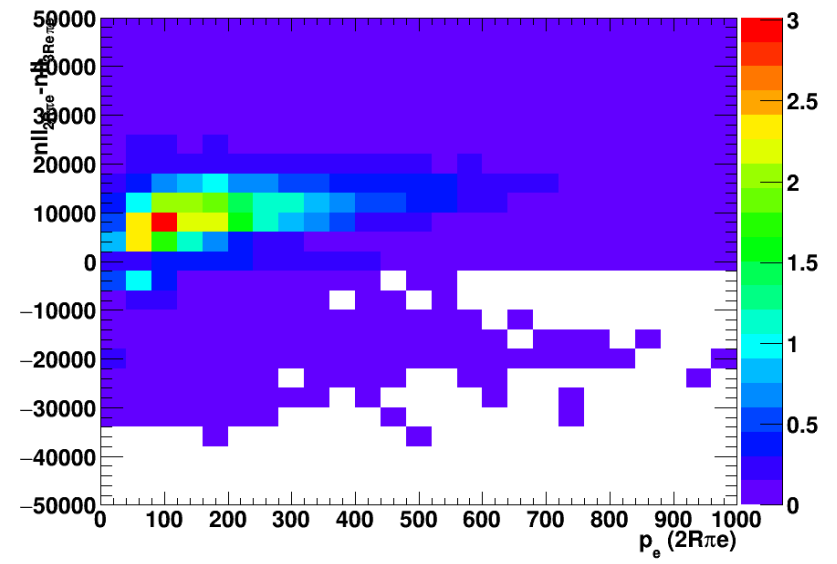
$nll_{2R\pi e} - nll_{3Re\pi e}$: FCFV



$nll_{2R\pi e} - nll_{3Re\pi e}$ vs p_e (2Rπe): FCFV, 2-ring ν_e CC1π

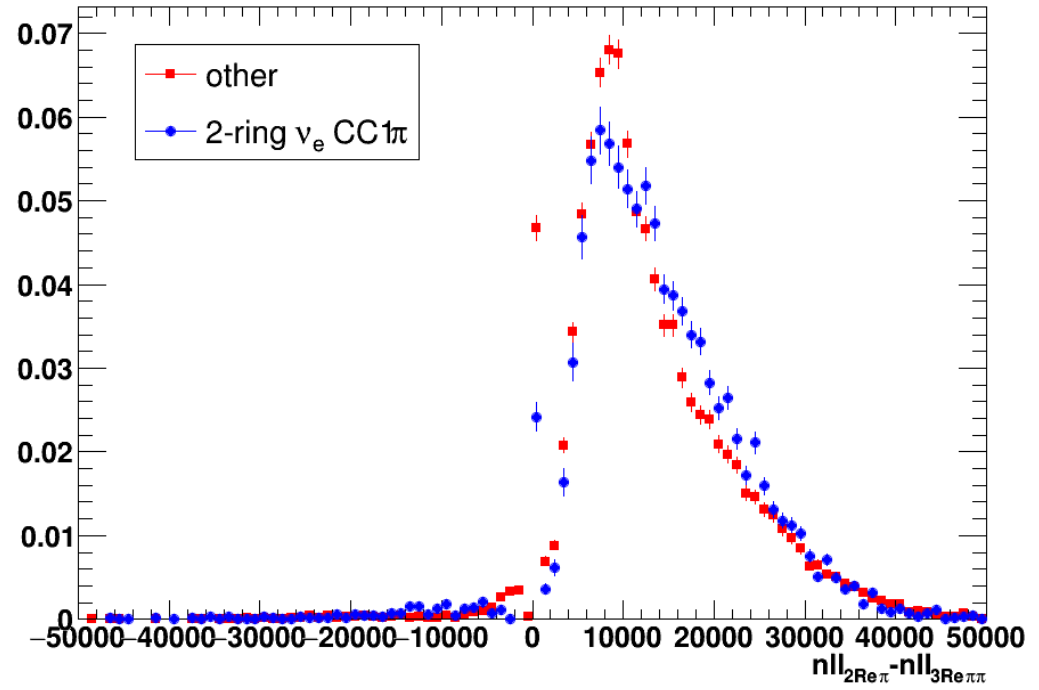


$nll_{2R\pi e} - nll_{3Re\pi e}$ vs p_e (2Rπe): FCFV, other

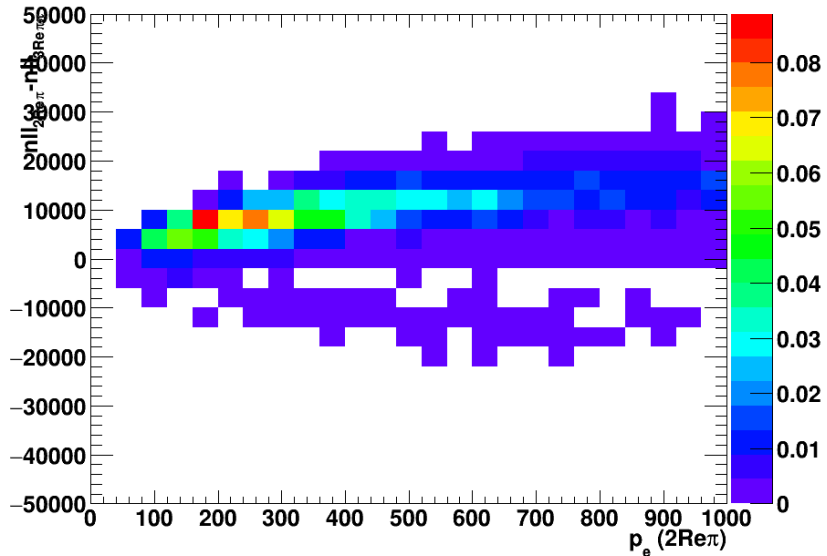


2Reπ vs 3Reππ

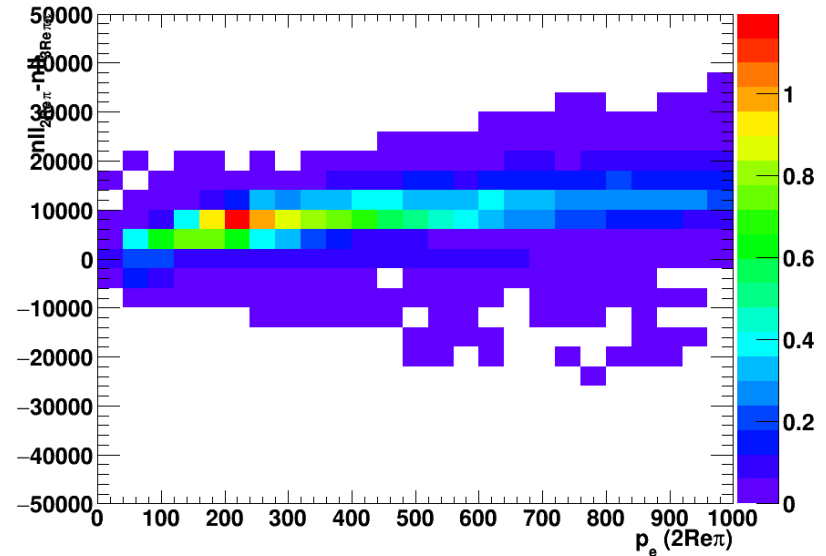
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$nI_{2Re\pi} - nI_{3Re\pi\pi}$ vs p_e (2Reπ): FCFV, 2-ring ν_e CC1π

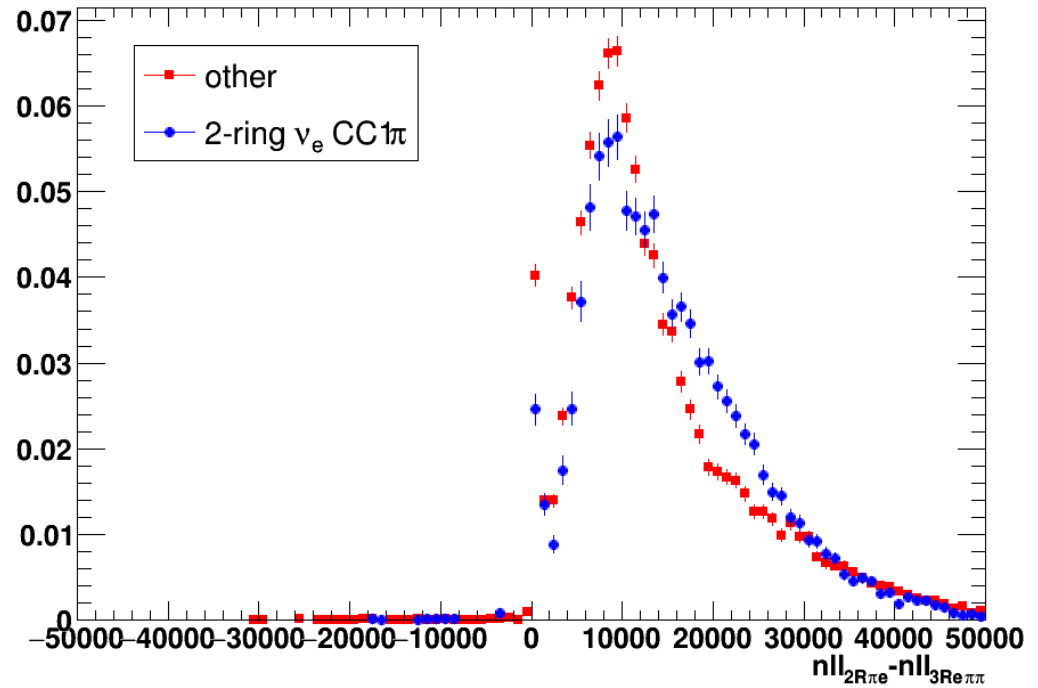


$nI_{2Re\pi} - nI_{3Re\pi\pi}$ vs p_e (2Reπ): FCFV, other

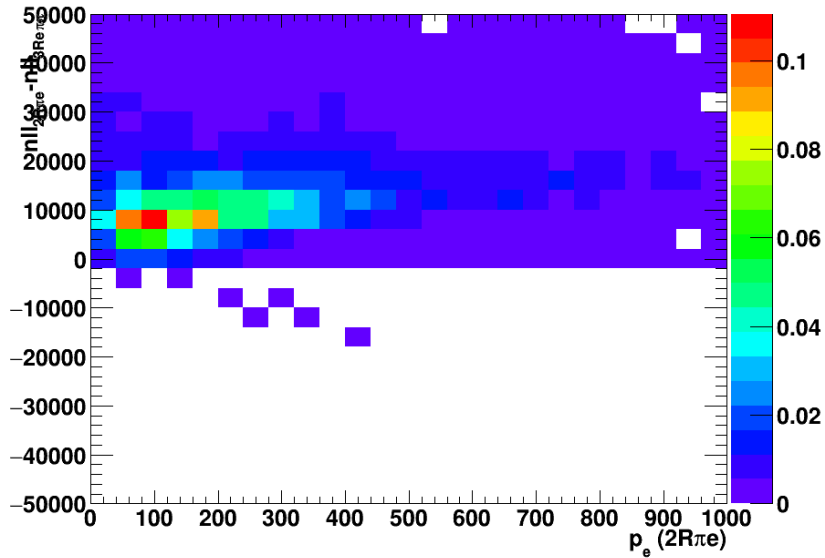


2R πe vs 3Re $\pi\pi$

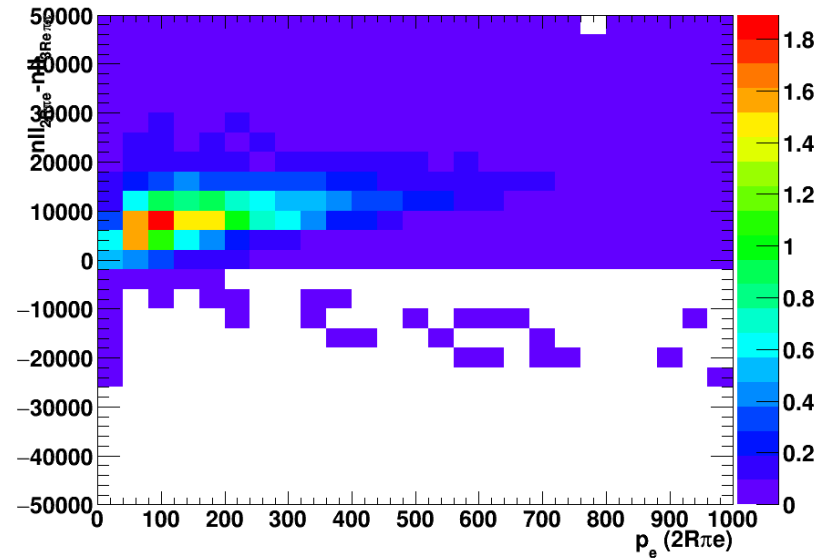
$nll_{2R\pi e} - nll_{3Re\pi\pi}$: FCFV



$nll_{2R\pi e} - nll_{3Re\pi\pi}$ vs $p_e(2R\pi e)$: FCFV, 2-ring ν_e CC1 π



$nll_{2R\pi e} - nll_{3Re\pi\pi}$ vs $p_e(2R\pi e)$: FCFV, other



Notes on new $2R\epsilon\pi$ -like cut attempt

- Started by adding 2R-like events
 - $2R\mu\epsilon$ -like events modestly improve efficiency, but when adding $2R\mu\epsilon$ rejection efficiency improvement is lost (though purity improves)
 - $3R\epsilon\epsilon\epsilon$ -like events improve efficiency significantly (particularly for $0de$ sample), but lots of ν_e $CCother$ and $CC1\pi^0$ background
 - Other 3R reconstructed events improve efficiency modestly, but all struggle with backgrounds
 - $3R\epsilon\pi\pi$ is most pure
- Working now on more systematic approach to expanding selection