Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Neutrino interaction modelling using DUNE's ultra-high performance gaseous argon near detector SEBASTIAN JONES, University College London, DUNE COLLABORATION — Mismodelling of neutrino interactions in long baseline oscillation experiments can lead to significant biases in the measured neutrino oscillation parameters. In order to prevent this mismodelling, long baseline neutrino oscillation experiments typically use a near detector to constrain their interaction model. The DUNE experiment will feature a multi-component near detector (ND) which will serve this purpose. The ND-GAr component of the DUNE ND is particularly well-suited to this purpose, with a low energy threshold for track reconstruction and excellent particle identification capabilities. ND-GAr will consist of a time projection chamber filled with an argon-methane mixture operating at a pressure of 10 bar, surrounded by an electromagnetic calorimeter. The whole detector will be within a 0.5 T magnetic field. We show that information gained from simulated ND-GAr events can be used to identify the prescence of a deficiency in the interaction model. In this case, the 'deficiency' we introduce is the use of an alternative neutrino interaction generator. Additionally, results are presented showing that information from the near detector can be used to reweight far detector Monte Carlo events, reducing biases in the oscillation parameters induced by cross-section mismodelling.

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Date submitted: 08 Jan 2021 Electronic form version 1.4