



Poster session 4 – Friday 8 July

P4.061 Measurement of the double-beta decay half-life and search for the neutrinoless double-beta decay of Ca-48 with the NEMO-3 detector

C Vilela¹ and D Waters²

¹Stony Brook University, USA ²University College London, UK

on behalf of NEMO-3 collaboration

Neutrinoless double- β decay is a powerful probe of lepton number violating processes that may arise from Majorana terms in neutrino masses, or from supersymmetric, left-right symmetric, and other extensions of the Standard Model. Of the candidate isotopes for the observation of this process, ^{48}Ca has the highest $Q_{\beta\beta}$ -value, resulting in decays with energies significantly above most naturally occurring backgrounds. The nucleus also lends itself to precise matrix element calculations within the nuclear shell model. We present the world's best measurement of the two-neutrino double- β decay of ^{48}Ca , obtained by the NEMO-3 collaboration using 5.25 yr of data recorded with a 6.99 g sample of isotope, yielding ≈ 150 events with a signal to background ratio larger than 3. Neutrinoless modes of double- β decay are also investigated, with no evidence of new physics. Furthermore, these results indicate that two-neutrino double- β decay would be the main source of background for similar future searches using ^{48}Ca with significantly larger exposures.