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A new experimental facility for nuclear structure studies relevant for neutrino physics

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Nuclear structure information obtained from transfer reactions

can be used to test calculations of nuclear matrix elements,

which is a key ingredient in the ultimate search for the effective neutrino mass.

There are only a few remaining facilities that combine suitable accelerators and magnetic spectrometers in order to perform these precision, though fairly routine, experiments.

It is proposed that the experimental facilities at the Separated Sector Cyclotron facility of iThemba LABS, South Africa, be made available to help extend current studies by investigating pair-transfer (p,t) reactions along isotopic chains.

The well-established zero-degree capability of the K600 magnetic spectrometer will be useful in the identification of 0+ states.

However, as the original focal plane detector package of the K600

was designed to detect protons in excess of 100 MeV, we aim to instrument the K600 with a new detector system. This is necessary to optimally observe the lower energy tritons necessary to achieve the proper momentum matching conditions required in (p,t) reactions for 20-30 MeV proton beams.

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