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Measuring decays of excited states in 26Si to improve reaction rate calculations of 22Mg(α,p)25Al relevant to type I X-ray bursts

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The K600 magnetic spectrometer and the CAKE silicon detector array form a powerful tool for coincidence measurements in many nuclear physics experiments, including nuclear astrophysics. These instruments have been used, among others, in studies measuring proton decays from αunbound states in 22Mg through the 24Mg(p,t)22Mg reaction to study the 18Ne(α,p)21Na cross section relevant in type-I X-ray bursts (XRBs) during breakout reactions from the Hot-CNO cycles in Red Giant and neutron star binaries. Similarly, this experimental method has been utilised during the measurement of the 50Cr(p,t)48Cr reaction to determine the 44Ti(α,p)47V reaction rate indirectly. This talk will examine the 28Si(p,t)26Si experiment that has been approved for beamtime at iThemba LABS, Cape Town. This reaction can be used in coincidence measurements to study proton decays from α-unbound states in 26Si to determine the cross section and thermonuclear reaction rate of 22Mg(α,p)25Al and its influence on type-I XRBs.

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