

# The K600 magnetic spectrometer and the CAKE silicon detector array: measurements 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 measurements including nuclear astrophysics. These instruments have been used, among others, in studies measuring proton decays from  $\alpha$ -unbound states in  $^{22}\text{Mg}$  through the  $^{24}\text{Mg}(p,t)^{22}\text{Mg}$  reaction to study the  $^{18}\text{Ne}(\alpha,p)^{21}\text{Na}$  cross section relevant in type-I X-ray bursts (XRBs). The thermonuclear reaction rate of  $^{18}\text{Ne}(\alpha,p)^{21}\text{Na}$  is one of the important rates that affect the behaviour of the XRB lightcurve. This talk will examine the  $^{22}\text{Mg}(p,t)^{22}\text{Mg}$  experiment that was performed at iThemba LABS, Cape Town and discuss future experiments with the  $^{28}\text{Si}(p,t)^{26}\text{Si}$  reaction to study proton decays from  $\alpha$ -unbound states in  $^{26}\text{Si}$  to study the cross section and thermonuclear reaction rate of  $^{22}\text{Mg}(\alpha,p)^{25}\text{Al}$  and its influence on type-I XRBs.