

## High-resolution $^{50}\text{Cr}(p,t)^{48}\text{Cr}$ coincidence measurements using the K600 and CAKE setup at iThemba LABS

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The observation of  $\gamma$ -ray decays from the radioactive isotope  $^{44}\text{Ti}$  makes it one of the significant isotopes in the diagnosis of core-collapse supernovae (CCSNe) explosions. The abundance of  $^{44}\text{Ti}$  from CCSNe explosions has been shown to be strongly dependent on the  $^{44}\text{Ti}(\alpha, p)^{47}\text{V}$  reaction rate, which destroys  $^{44}\text{Ti}$ . Direct measurements of the  $^{44}\text{Ti}(\alpha, p)^{47}\text{V}$  reaction within the Gamow window ( $E_{\text{c.m.}} = 2 - 6 \text{ MeV}$ ) have been challenging due to the low cross sections and insufficient radioactive ion beam intensities. As a result, the reaction rate is still based on statistical models, which may not be reliable for  $\alpha$ -induced reactions on  $N=Z$  nuclei due to the lower effective level density in the compound nucleus. To get the necessary experimental constraints of the  $^{44}\text{Ti}(\alpha, p)^{47}\text{V}$  reaction such as the level density and branching ratios of the compound nucleus,  $^{48}\text{Cr}$ , a high-resolution  $^{50}\text{Cr}(p, t)^{48}\text{Cr}$  coincidence measurement was performed using the K600 magnetic spectrometer and an array of five double-sided silicon detectors called CAKE. Preliminary results from the coincidence measurements will be presented.

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