

Spectroscopy of ^{48}Cr by the $^{50}\text{Cr}(p, t)^{48}\text{Cr}$ reaction

The radioactive nucleus ^{44}Ti is thought to be produced in Core-Collapse Supernovae (CCSNe) with the amount produced being sensitive to internal dynamics of the explosion. As such, ^{44}Ti is a potential diagnostic tool for understanding the behaviour of these stellar explosions.

The amount of ^{44}Ti produced depends not only on the production reactions but also on the destruction reactions, most notably the $^{44}\text{Ti}(\alpha, p)^{47}\text{V}$ reaction which proceeds through states in the compound nucleus ^{48}Cr . This reaction is usually treated through statistical models (see, for example, the recent study by Chipps and collaborators Phys. Rev. C 102, 035806) but it is not clear that this is valid given the limitations of the levels which can be populated in $^{44}\text{Ti}+\alpha$ fusion (natural parity, isoscalar) and the influence of α -particle clustering behaviour on other α -particle induced reactions.

Spectroscopy in the Gamow Window of the $^{44}\text{Ti}(\alpha, p)^{47}\text{V}$ reaction has been performed using the $^{50}\text{Cr}(p, t)^{48}\text{Cr}$ reaction with the K600 magnetic spectrometer at iThemba LABS in South Africa. A number of excited states have been observed, many for the first time, giving insights into the validity of statistical models for the $^{44}\text{Ti}(\alpha, p)^{47}\text{V}$ reaction.

Length of presentation requested

Oral presentation: 8 min + 2 min questions (Poster-type talk)

Please select between one and three keywords related to your abstract

Nuclear physics - experimental

2nd keyword (optional)

3rd keyword (optional)

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