

Abstract Submitted
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Study of 0^+ States and Collectivity in ^{154}Gd by the $(p,t\gamma)$ Reaction J.M. ALLMOND, University of Richmond, VA, STARS LIBERACE COLLABORATION — Recent experiments [1] have revealed an unusual number of low-lying 0^+ states (< 3 MeV) in a number of rare-earth nuclei, including $^{154,156}\text{Gd}$. Indeed, the structure of these and neighboring ($N \sim 90$) nuclei have been of recent interest [2]. To investigate the decay and population of these 0^+ states, an experiment was conducted at the 88" cyclotron at LBNL using the STARS and LiBerACE detector arrays. A 25 MeV proton beam incident onto a ^{156}Gd target was used to populate states in ^{154}Gd by the $(p,t\gamma)$ reaction and ^{156}Gd by $(p,p'\gamma)$. The exit channel of the reaction and the residual excitation energy of the nucleus were tagged by detecting scattered charged particles in a Si telescope array (STARS) while coincident γ rays were detected using 6 Ge clovers and 1 Ge LEPS detector of the LiBerACE array. Branching ratios, population distributions, and particle- γ correlations are used to probe the nature of 0^+ states and collectivity in ^{154}Gd . Preliminary results are presented. DE-FG52-06NA26206 (UR), DE-AC52-07NA27344 (LLNL), and DE-AC02-05CH11231 (LBNL).

[1]S.R. Leshner, *et al.*, Phys. Rev. C **66**, 051305 (2002);D.A. Meyer, *et al.*, Phys. Rev. C **74**, 044309(2006).

[2]W.D. Kulp, *et al.*, Phys. Rev. Lett. **91**, 102501(2003);W.D. Kulp, *et al.*, Phys. Rev. C **77**, 061301(2008).

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