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High-lying, non-yrast shell structure in 52Ti[1] SHAOFEI ZHU, R.V.F. JANSSENS, M.P. CARPENTER, B.P. KAY, F.G. KONDEV, T. LAURITSEN, C.J. LISTER, A. ROBINSON, D. SEWERYNIAK, X. WANG, Argonne National Laboratory, B. FORNAL, R. BRODA, W. KROLAS, T. PAWLAT, J. WRZESINSKI, Institute of Nuclear Physics, Poland, S.J. FREEMAN, A. DEACON, J.F. SMITH, D. STEPPENBECK, University of Manchester, UK, M. HONMA, University of Aizu, Japan, P.F. MANTICA, S.N. LIDDICK, B.E. TOMLIN, Michigan State University, T. OTSUKA, University of Tokyo, Japan, A. LARABEE, Greenville College — The level structure of 52Ti was studied following fusion-evaporation and incomplete-fusion reactions. As a result, an extensive level scheme is now available for high-lying, non-yrast states in this nucleus. The newly-established level sequence provides further tests of full pf-shell calculations with the GXPF1A interaction. With only 2 protons and 2 neutrons outside the double-magic nucleus 48Ca, 52Ti can be described very well by the shell-model calculations without the need for a larger model space. In addition, the observed high-energy gamma transitions at high spin are attribued to the N=32 shell gap in neutron-rich Ti isotopes, which reflects the large energy separation between the neutron p3/2 and p1/2 orbitals due to the weakening of the attractive monopole interaction beween the proton f7/2 and the neutron f5/2 orbitals.

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