



Contribution ID: 125

Type: Oral

High resolution study of $T_z=3 \rightarrow 2$ Gamow Teller transitions in the $^{50}\text{Ti}(^3\text{He},t)^{50}\text{V}$ reaction

Monday, 31 August 2015 14:45 (15 minutes)

Among the weak processes in nuclei, Gamow-Teller (GT) transitions caused by the $\sigma\tau$ -type interaction are very popular. They play important roles, for example, in the early stage of the core collapse of supernovae. Studies of GT strengths $B(\text{GT})$ in pf-shell nuclei using (p,n) and (n,p) Charge-Exchange (CE) reactions at intermediate energies started in the 1980s. They provided rich information on the overall GT strength distributions but individual transitions were only poorly studied due to their limited energy resolutions of ~ 300 keV. A development in precise beam matching techniques realized an energy resolution of ~ 30 keV in intermediate energy ($^3\text{He},t$) reactions at 0° . With this one order of magnitude better resolution, GT and Fermi states that were unresolved in the pioneering (p,n) reactions can be studied. In order to study the Gamow-Teller (GT) transitions from the $T_z=+3$ nucleus ^{50}Ti to the $T_z=2$ nucleus ^{50}V , where T_z is the z component of isospin T, we performed a (p,n)-type ($^3\text{He},t$) charge-exchange (CE) reaction at 140 MeV / nucleon and the scattering angles around 0° . An energy resolution of 21.5 keV, that was realized by applying matching techniques to the magnetic spectrometer system, allowed the study of fragmented states. Assuming the proportionality between reaction cross-sections and GT transition strengths $B(\text{GT})$, the $B(\text{GT})$ values were derived up to the excitation energy (E_x) of 15 MeV.

Primary author: SUSOY DOGAN, GULFEM (ISTANBUL UNIVERSITY)

Co-authors: Dr ALGORA, A. (Instituto de Física Corpuscular, CSIC-Universidad de Valencia, E-46071 Valencia, Spain); Dr KRASZNAHORKAY, A. (Institute of Nuclear Research of the Hungarian Academy of Sciences (ATOMKI), P.O.Box 51, H-4001 Debrecen, Hungary); Prof. TAMII, A. (Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan); Dr RUBIO, B. (Instituto de Física Corpuscular, CSIC-Universidad de Valencia, E-46071 Valencia, Spain); Dr GUESS, C. J. (National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, Michigan 48824-1321, USA Joint Institute for Nuclear Astrophysics, Michigan State University, East Lansing, Michigan 48824, USA Department of Physics and Astronomy, Michigan State University, East Lansing, Michigan 48824, USA); Dr SCHOLL, C. (Institut für Kernphysik, Universität zu Köln, 50937 Köln, Germany); Dr ISHIKAWA, D. (Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan); Dr ESTEVEZ-AGUADO, E. (Instituto de Física Corpuscular, CSIC-Universidad de Valencia, E-46071 Valencia, Spain); Dr GANIOĞLU, E. (Department of Physics, Istanbul University, Istanbul 34134, Turkey); Dr MOLINA, F. (Instituto de Física Corpuscular, CSIC-Universidad de Valencia, E-46071 Valencia, Spain); Dr PERDIKAKIS, G. (National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, Michigan 48824-1321, USA Joint Institute for Nuclear Astrophysics, Michigan State University, East Lansing, Michigan 48824, USA Department of Physics and Astronomy, Michigan State University, East Lansing, Michigan 48824, USA); Dr FUJITA, H. (Department of Physics, Osaka University, Toyonaka, Osaka 560-0043, Japan); Dr ONG, H. J. (Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan); Dr MATSUBARA, H. (Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan); Dr OKAMURA, H. (Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan); Dr THIES, J. H. (Institut für Kernphysik, Universität zu Köln, 50937 Köln, Germany); Dr ZENIHIRO, J. (Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan); Dr HATANAKA, K. (Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka

567-0047, Japan); Dr HIROTA, K. (Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan); Dr CSATLOS, M. (Institute of Nuclear Research of the Hungarian Academy of Sciences (ATOMKI), P.O.Box 51, H-4001 Debrecen, Hungary); Dr DEAVEN, M. (National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, Michigan 48824-1321, USA Joint Institute for Nuclear Astrophysics, Michigan State University, East Lansing, Michigan 48824, USA Department of Physics and Astronomy, Michigan State University, East Lansing, Michigan 48824, USA); Prof. HONMA, M. (Center for Mathematical Science, University of Aizu, Aizu-Wakamatsu, Fukushima 965-8580, Japan); Prof. ZEGERS, R. G. T. (National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, Michigan 48824-1321, USA Joint Institute for Nuclear Astrophysics, Michigan State University, East Lansing, Michigan 48824, USA Department of Physics and Astronomy, Michigan State University, East Lansing, Michigan 48824, USA); Dr MEHARCHAND, R. (National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, Michigan 48824-1321, USA Joint Institute for Nuclear Astrophysics, Michigan State University, East Lansing, Michigan 48824, USA Department of Physics and Astronomy, Michigan State University, East Lansing, Michigan 48824, USA); Dr ADACHI, T. (Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan); Dr OTSUKA, T. (Department of Physics, University of Tokyo, Hongo, Bunkyo, Tokyo 113-0033, Japan); Dr SUZUKI, T. (Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan); Prof. FUJITA, Y. (Department of Physics, Osaka University, Toyonaka, Osaka 560-0043, Japan); Dr SHIMBARA, Y. (Graduate School of Science & Technology, Niigata University, Nishi, Niigata, 950-2181, Japan); Dr GULYÁS, J. (Institute of Nuclear Research of the Hungarian Academy of Sciences (ATOMKI), P.O.Box 51, H-4001 Debrecen, Hungary)

Presenter: SUSOY DOGAN, GULFEM (ISTANBUL UNIVERSITY)

Session Classification: Nuclear Structure, Spectroscopy, and Dynamics I