Abstract Submitted
for the DNP08 Meeting of
The American Physical Society

**New Measurements of spectroscopic factors for low-lying $^{16}$N levels** P.D. O'MALLEY, Rutgers, J.A. CIZEWSKI, Rutgers University, R. HATARIK, S.D. PAIN, Rutgers University, W.A. PETERS, Rutgers, D.W. BARDAYAN, C.D. NESARAJA, M.S. SMITH, J.C. BLACKMON, ORNL, K.L. JONES, S.T. PITTMAN, K.Y. CHAE, S. PAULAUSKAS, B.H. MOAZEN, U. of Tenn., R.L. KOZUB, J.F. SHRINER, JR., Tenn. Tech. U., C. MATEI, ORAU, K.A. CHIPPS, Col. School of Mines — The origin of galactic $^{19}$F is uncertain, but thought to be created via the $^{15}$N(a,g)$^{19}$F reaction. However, many of the reaction rates involved are not well known. In particular, the $^{15}$N(n,g)$^{16}$N reaction bypasses $^{19}$F production at a rate that depends on neutron spectroscopic factors of low-lying $^{16}$N levels. The previously measured values ($\sim$0.5) differed greatly from the expected values of near unity, based on Oxbash calculations for the closed neutron shell of $^{15}$N. Knowledge of these spectroscopic factors is also important for fine-tuning shell model calculations. We have performed a new study of the $^{15}$N(d,p)$^{16}$N reaction in inverse kinematics with 100-MeV $^{15}$N beam from the HRIBF on a $CD_2$ target. Reaction protons were detected using the SIDAR and ORRUBA silicon detector arrays. The data and analysis will be presented. *Work supported in part by DOE and NSF.

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Date submitted: 02 Jul 2008 Electronic form version 1.4