# Beta-decay near the double shell closure at $^{78}$Ni *

C. Mazzocchi[1)], R. Grzywacz[1)], J.C. Batchelder[2)], C.R. Bingham[1,3)], D. Fong[4)], J.H. Hamilton[3,4)], J.K. Hwang[4)], M. Karny[5)], W. Królas[4,6)], S.N. Liddick[7)], A.C. Morton[7)†], P.F. Mantica[7)], W.F. Mueller[7)], K. Rykaczewski[3)], M. Steiner[7)], A. Stolz[7)], J.A. Winger[8)]

[1] *Department of Physics and Astronomy, University of Tennessee, Knoxville, TN 37996, USA*
[2] *Oak Ridge Associated Universities, Oak Ridge, TN-37831, USA*
[3] *Physics Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA*
[4] *Department of Physics, Vanderbilt University, Nashville, TN-37235, USA*
[5] *Institute of Experimental Physics, Warsaw Univeristy, Warsaw, PL-00681, Poland*
[6] *Joint Institute for Heavy Ion Research, Oak Ridge National Laboratory, Oak Ridge, TN-37831, USA*
[7] *National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, MI-48824, USA*
[8] *Department of Physics, Mississippi State University, Mississippi State, MS-39762, USA*

The neutron-rich, doubly-magic nucleus $^{78}$Ni and its neighbors are benchmarks for testing nuclear structure models far from stability. According to shell-model calculations with effective interactions[e.g., 1], the large neutron excess in the region close to $^{78}$Ni is expected to modify single-particle energies, which may lead to the weakening or disappearance of traditional shell-gaps. These nuclei are of interest for nuclear astrophysics, since the r-process nucleosynthesis is supposed to be initiated close to $^{78}$Ni [2]. Very little is known empirically about $^{78}$Ni.

Several experimental studies on neutron-rich Z$\sim$28 and 40<N<50 nuclei based on fragmentation reactions have been performed [3-6]. These very sensitive measurements not only provided the first information on the lowest excited states of the semi-magic nickel isotopes from $^{70}$Ni to $^{76}$Ni, but also stimulated the development of a new shell-model description [7]. Moreover, these studies provided the first identification of beta-delayed neutron emission from $^{71-74}$Co [8], where larger than predicted branching ratios pointed to important nuclear structure effects. The latter phenomenon is of astrophysical interest since it provides information on the Gamow-Teller beta-strength distribution and on the branching ratios that are fundamental input parameters for calculations of the r-process network. Branching ratios for beta-delayed neutron decay in this region of the chart of nuclei were recently reported in [9] and are in good agreement with our results.

An overview of the experimental results on the beta decay of neutron rich nuclei in the vicinity of $^{78}$Ni obtained in a measurement performed recently at the National Superconducting Cyclotron Laboratory at Michigan State University will be presented and discussed in comparison with theoretical predictions.

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†present address: TRIUMF, Vancouver B.C. V6T 2A3, Canada