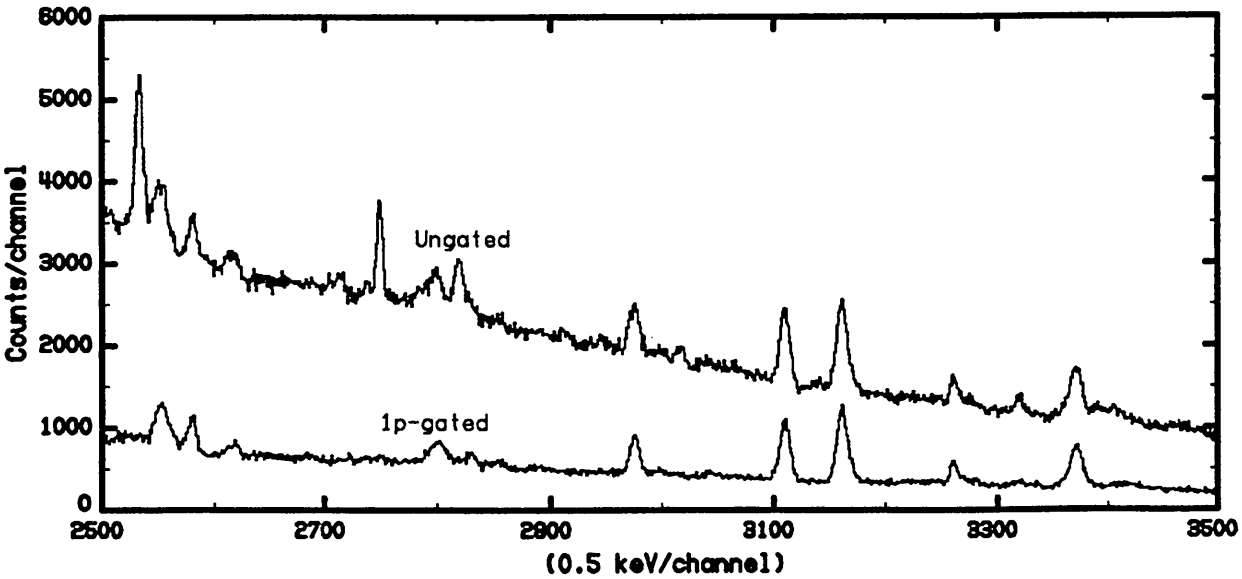
FIRST RESULTS WITH THE MICROBALL AND GAMMASPHERE

D.G. Sarantites, P.-F. Hua, D. LaFosse, M. Korolija, J. Elson, J.T. Hood, Washington University, C. Baktash, C. Gross, Hao-Qiang Jin, D.W Stracener, Oak Ridge National Laboratory, I.Y. Lee, A. Machiavelli, B. Cederwall, P. Fallon, W. Rathbun, Lawrence Berkeley Laboratory, and A. Vandermolen, Michigan State University.

The MICROBALL, a 4π-charged particle detector array, was used recently in conjunction with GAMMASPHERE in three different experiments. The MICROBALL consists of 95 CsI(Tl) scintillators with individual photodiode readout, arranged in 9 rings. It provides a 98% solid angle coverage and can achieve single charged-particle detection and identification efficiencies between 90-95%, depending on counting rate and reaction system. For reactions leading to neutron deficient systems heavier than A$\sim$100, it can keep up with GAMMASPHERE with overall pile-up losses smaller than those of GAMMASPHERE. For moderate to low cross section charged particle channels, the peak to background improves by a factor of 3-5, without sacrificing a coincidence fold. Detailed comparisons of the enhancement of GAMMASPHERE for spectroscopic studies in different regions will be shown. Results taken from two recent experiments will be discussed. The first of these was aimed at a search for hyperdeformation in ^{146}Gd produced by the reaction ^{100}Mo(^{51}V, p4n) at 230 MeV. A total of $8{\cdot}10^8$ proton gated unfolded triple events were collected in 80 hours and analyzed. A previously observed SD ridge was seen in a preliminary examination of the data. In this reaction the proton gating gave an increase of the peak to background ratio by a factor of 4 (see figure below). All of the shown lines in the proton gated spectrum are from ^{146}Gd.



In the second experiment a search for superdeformation in ^{83}Y produced by the reaction ^{58}Ni(^{29}Si, 3pn) at 130 MeV was undertaken. The superdeformed bands in this nucleus are expected to occur at lower spins compared to the recently observed [1] SD band in ^{82}Sr. In this experiment excellent charged particle channel selection was achieved.

[1] C. Baktash et al., to be published.