RADIOACTIVE DECAY STUDIES OF NUCLEI PRODUCED FROM BOMBARDMENT BY INTERMEDIATE-ENERGY NEUTRONS.

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An intermediate energy secondary neutron irradiation facility capable of handling gram quantities of target material has been in operation in the isotope production area beam dump. The neutrons are produced in a 2.5 inch metal copper beam stop. Targets are transported into the beam dump using a solid target transport system whose transit time to the receiving terminal in the chemistry trailer is about 5 sec.

Initially we measured the neutron flux, ϕ_n, on target for a range of proton beam energies. The flux measurements were made by bombarding Al samples and using the known[1] cross section for the production of 15-hour ^{24}Na by the $^{27}Al(n,\alpha)^{24}Na$ reaction. These results are summarized in Figure 1, where we compare the specific neutron flux ($n/cm^2/sec$ per μA of protons) with that obtained at the Brookhaven Medium-Energy Intense Neutron (MEIN) facility.[1] We observe a factor of 4 increase in the overall excitation function as compared to that of BNL (MEIN). We owe this increase to geometry considerations in fixing the irradiation position immediately behind the stop.

Preliminary results from irradiations of ^{89}Y have yielded some new information concerning the decay of ^{84}Y produced by the (n,6n) reaction. An isomeric pair in ^{84}Y was searched for but none was observed; if an isomer exists, then its half-life is less than a few minutes. In addition, a new series of experiments are under way in the very neutron-rich Lu and Hf region where several new isotopes or high-spin isomers are predicted to exist with relatively long half-lives.

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1) S. Katcoff et al., Nucl. Instr. Meth. 129 (1975) 473.

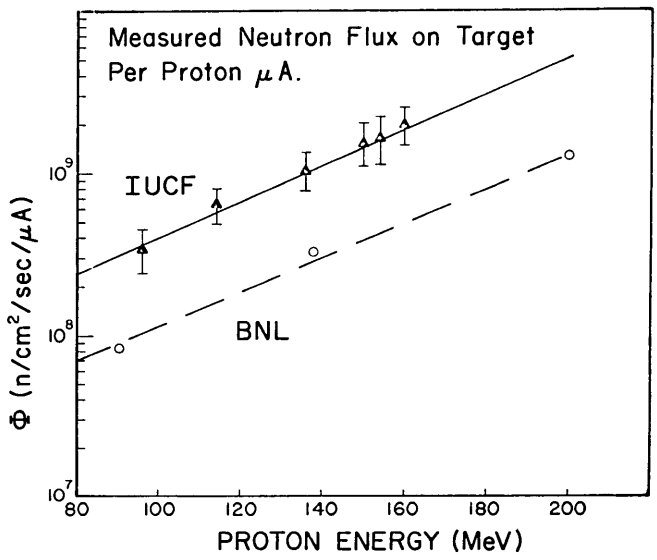

Figure 1.