

190 MeV PROTON-INDUCED FISSION*

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Proton-induced fission of targets $A=238$ to $A=130$ has been observed for $E_p=190$ MeV at the Indiana University Cyclotron Facility. A preliminary experiment has been done in the large scattering chamber using a pair of silicon surface barrier detectors (E_1 and E_2) in coincidence and a carbon-foil, channel-plate start detector in one detector arm for TOF mass identification. The $^{238}\text{U}(p,f)$ angular correlation is similar to low-energy fission and the mass distribution is mostly asymmetric for $(\theta_1-\theta_2)=180^\circ$ in the center-of-mass (Fig. 1). These preliminary data suggest that the width of both the total energy distribution and the mass distribution may increase

substantially for $A<160$ (Fig. 2). Such an increase may indicate the onset of LDM instability to asymmetric fission (Businaro-Gallore point).

The results will be compared with higher energy proton data¹ and with cascade/fission predictions. The latter are applicable at IUCF proton energies since they are at low angular momenta, involve small mass transfers and are below pion-production thresholds. This will permit one to extract fission barriers (for $A<200$) for comparison with results derived from both high-energy heavy ions and protons of energy greater than 200 MeV.

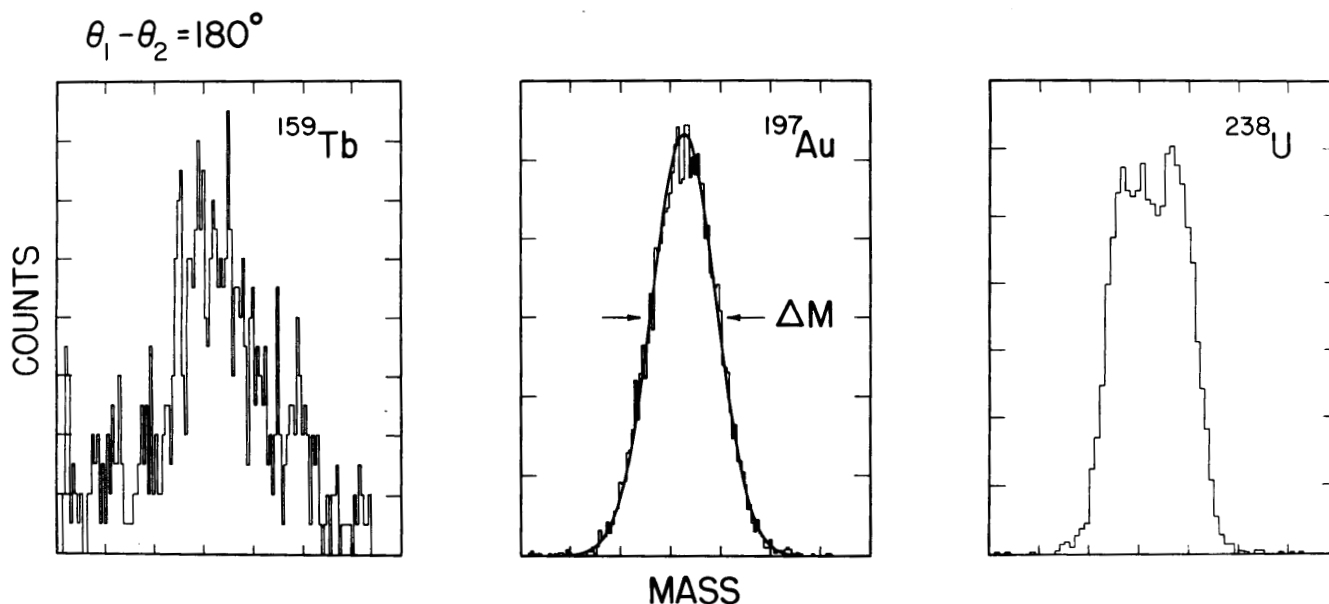


Figure 1. Mass distributions inferred for 190 MeV proton-induced fission on various targets as a function of $\theta_1-\theta_2$, the detector settings.

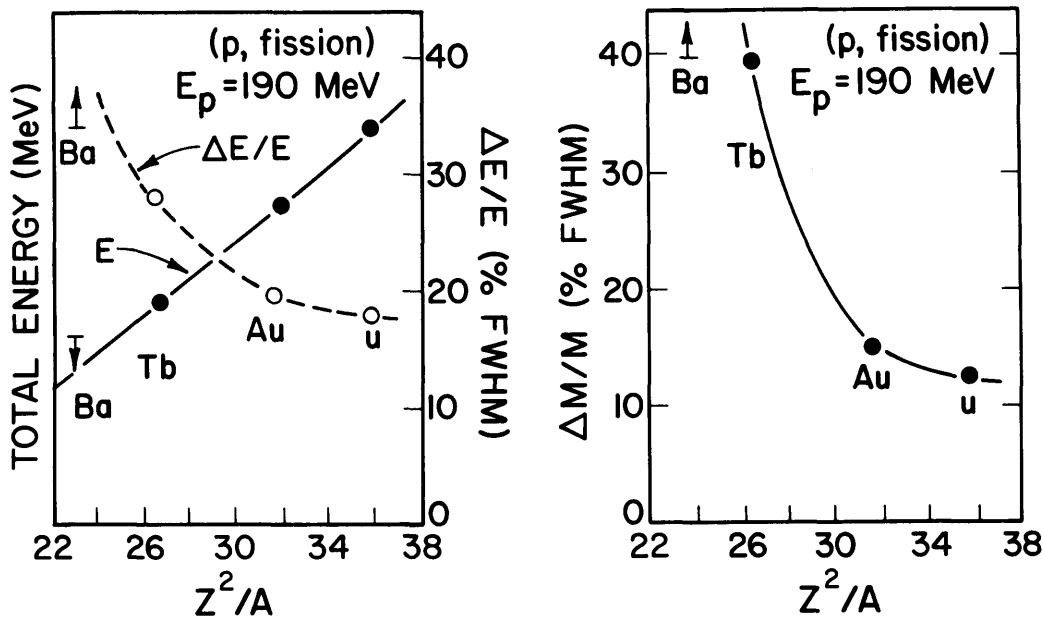


Figure 2. The total energy ($E_1 + E_2$), the energy width (FWHM) and the inferred mass width (Fig. 1) for 190 MeV proton-induced fission.

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- 1) G. Anderson, M. Areskoug, H.A. Gustafsson, G. Hylten, B. Schroder, and E. Hagebo, Z. Phys. A293, 241 (1979).

A STUDY OF THE DECAYS OF $^{194,195,196}\text{Pb}$

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Decay properties of $^{194,195,196}\text{Pb}$ have been studied using singles and coincident γ -ray spectroscopy. Sources were produced by the 95 MeV $^{197}\text{Au}(^6\text{Li}, \text{xn})$ reactions. No direct evidence for the decay of a low-spin isomer of ^{195}Pb was observed. Several new levels were observed in $^{195,196}\text{Tl}$, and are interpreted in terms of a rotational model. The low-lying states of the odd Tl nuclei are especially interesting in view of their proposed^{1,2} oblate deformation. States of fairly high spin in these nuclei can be studied by observing the γ -rays following

the β/EC decay of the isomeric $13/2^+$ levels³ of the odd Pb nuclei.

The decay of the $13/2^+$ isomer in ^{195}Pb has been investigated by several groups.^{1,2,4,5} High-spin states of ^{195}Tl have also been studied using in-beam γ -ray spectroscopy.^{1,2} These studies are summarized in a recent compilation,^{6,7} which includes a preliminary report of the decay of ^{195}Pb . Levels in $^{194,196}\text{Tl}$ populated by $^{194,196}\text{Pb}$ decay have been known for some time.

The present study is an extension of our previous