

TARGET FRAGMENTATION IN ULTRARELATIVISTIC
NUCLEAR COLLISIONS

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We have measured the cross sections for the formation of intermediate mass fragments ($A_{\text{fragment}} < 60$) in the collision of 60 and 200 A GeV ^{160}O with ^{238}U . Typical data are shown in Figure 1 along with similar data from p-U and lower energy heavy ion-U collisions. Limiting fragmentation behavior of these cross sections is observed. The thresholds for multifragmentation (expressed in terms of the projectile energy per nucleon) are lower in nucleus-nucleus collisions as compared to p-nucleus collisions. These data are consistent with models in which multifragmentation is due to a mechanical instability of nuclear matter. If the same mechanism is responsible for limiting fragmentation behavior in p-nucleus and nucleus-nucleus collisions, it is not the oft-cited production of a hadronic state in the initial nucleon-target interaction that decays outside the nucleus due to time dilation.

The fraction of intermediate mass fragments recoiling forward relative to those recoiling backward (F/B) has been measured for the interaction of 14.6 A GeV ^{160}O with ^{197}Au . The mean $F/B = 0.85 \pm 0.02$, represents the first observation of a thick target-thick catcher (F/B) value less than unity for any high energy reaction. Limiting fragmentation behavior is not observed for this kinematic reaction property although it is observed for the production cross sections.

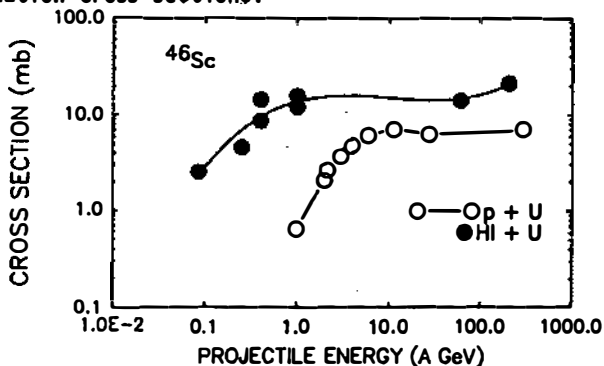


Figure 1

Excitation function for the production of a type of intermediate mass fragment, ^{46}Sc , in p-U and nucleus-U collisions.