

Notes on 1 GeV Proton RIB Production List

For UC target with label “S-T + exptl(n)” in the Sn and Kr product sheets:

Yield includes indirect production due to low-energy ($E < 20$ MeV) secondary neutrons. A LAHET simulation with 140 g/cm² UC target with the same radius (2 cm) used here, gives 0.16 fissions induced in target material by low-E neutrons per incident proton. The corresponding Sn (Kr) isotope yield was taken from the ENDEF experimental data base. The fission induced directly by 1 GeV p is calculated from S-T cross section. The yield for these isotopes could alternatively be taken from two step p+W+UC production. With a 12 cm long W primary target and a 2 cm thick UC blanket, the result is very similar. The secondary n contribution is negligible for isotopes not labeled “+ exptl(n)”. This is illustrated by sample two-step target yields on the Sn sheet.

For Th target with label “S-T + exptl(n)” in the Zr product sheets:

Yield includes indirect production due to low-energy ($E < 20$ MeV) secondary neutrons. A LAHET simulation with 140 g/cm² Th target with the same radius (2 cm) used here, gives 0.14 fissions induced in target material by low-E neutrons per incident proton. The corresponding Zr isotope yield from n-induced fission of ²³²Th was taken from the tabulation of E.A.C. Couch, Atomic and Nuclear Data Tables 19,417(1977). The fission induced directly by 1 GeV p is calculated from S-T cross section. The secondary n contribution is negligible for isotopes not labeled “+ exptl(n)”.

For all product sheets:

Blue (dark) highlight: Stable nucleus

Yellow (light) highlight: Half-life from theory or systematics (others measured).