Momentum Distribution of Projectile-like Fragments at E = 290 MeV/u

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The momentum distributions of projectile-like fragments (PLFs) were measured for various reaction systems at E=290MeV/u by using ISOL facility at HIMAC-NIRS. The momentum distributions not only reflect the production mechanism of PLFs, but also give important information to apply PLFs as radioactive nuclear beams.

The peak and width of observed longitudinal momentum (P_L) distributions were calculated. The systematic peak shift is found in P_L distribution. The peak shift can be compared with that observed at E~100 MeV/u [1]. The width of P_L distribution (σ_L) produced from ^{40}Ar beam is constant for wide range of fragments and targets (C, Al, Nb, Tb, Au), and consistent with Goldhaber's model [2]. σ_0 calculated from σ_L is consistent with the energy dependence shown in [3]. In contrast, σ_L of PLFs produced from ^{84}Kr beam depends on fragment mass (A_F), and significantly larger than that of PLFs produced from Ar beam, as shown in Fig. 1. It is expected that different types of reaction mechanism might contribute to produce PLFs from heavier beam. The width of observed transverse momentum (P_T) distributions was also calculated. The width of P_T distributions (σ_T), produced from ^{84}Kr beam, was shown as a function of A_F in Fig. 2. σ_T for Al target can be reproduced by σ_L based on the result from Ar beam well. The broadening of P_T distribution was observed for heavier (Nb) target with ^{84}Kr beam. The broadening effect in P_T distribution, which is promoted for heavier target, is consistent with the previous study [4]. By analyzing the broadening effect, the deflection of PLFs caused by Coulomb interaction with the target will be discussed.

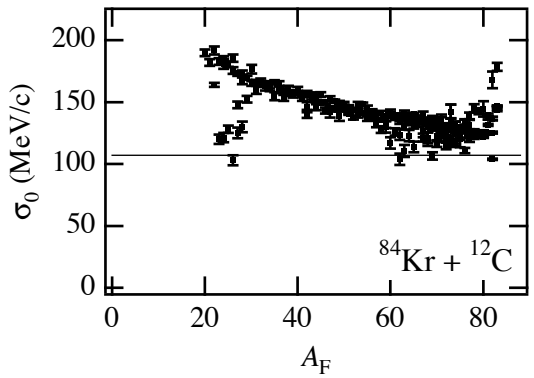

Fig. 1. σ_0 as a function of A_F for PLFs from Kr beam. σ_0 is calculated from observed σ_L. The solid line indicates σ_0 for PLFs from Ar beam.

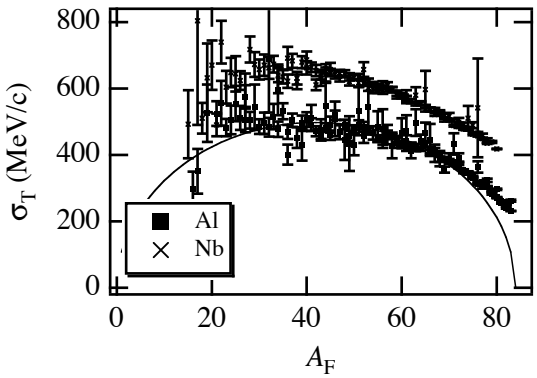

Fig. 2 σ_T as a function of A_F for PLFs from Kr beam. The solid line indicates σ_L calculated based on the results of Ar beam

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