Study of ^{22}Ne(^{6}Li,*t*)^{25}Mg three particle transfer reaction using TIARA and MDM spectrometer.

The (^{6}Li, *t*) transfer reaction serves as a powerful tool to study ^{3}He clustering states. Furthermore, for N=Z target nuclei (^{6}Li,*t*) and (^{6}Li, ^{3}He) are expected to populate mirror states in the resulting recoil nuclei, due to the strong ^{3}He + ^{3}H clustering property of ^{6}Li. There is also potential to study nuclear structures by three particle transfer, e.g., using a radioactive ion beam, which can be a useful method for nuclear astrophysics. The ^{22}Ne(^{6}Li,*t*)^{25}Mg experiment was performed in inverse kinematics using a 7 AMeV ^{22}Ne beam and ^{6}LiF target at the Texas A&M University Cyclotron Institute. To better understand (^{6}Li, *t*) three particle transfer reaction, measurements of ^{25}Mg, *t*, and gamma-rays were made in coincidence using a magnetic spectrometer, Si, and Ge detectors. By doing this, the populated states of ^{25}Mg were clearly identified thus enabling an understanding of the reaction selectivity. The angular differential cross sections were then measured to extract the spectroscopic factors. The results of this ^{22}Ne(^{6}Li,*t*)^{25}Mg analysis were compared with data from other reaction methods and theoretical calculations to improve the knowledge about the ^{22}Ne(^{6}Li,*t*)^{25}Mg reaction.