Reactions induced by 35 MeV ^{6}He beam on ^{12}C and ^{14}C

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The ^{6}He nucleus with its exotic structure [1] has been studied extensively in last years with ^{6}He radioactive beams, yielding different interesting results. Our studies of the ^{6}He scattering and reactions on ^{6}Li, ^{7}Li and ^{12}C using a 18 MeV ^{6}He beam gave us insights into ^{6}He induced elastic and inelastic scatterings [2, 3], transfer reactions [2, 4], quasi-free scattering and sequential decay processes [5]. The ^{6}He beam was found to be an excellent choice for studies of light exotic nuclei. In particular, we found the conclusive evidence for existence of very deformed molecule-like states in ^{10}Be [5]; the same result was recently reached in the ^{6}He+^{4}He resonant elastic scattering [6].

We have continued our studies of the ^{6}He induced reactions by measuring ^{6}He+^{12}C, ^{6}He+^{14}C and ^{6}He+^{16}O at 35 MeV at the radioactive beam facility in Louvain-la-Neuve, Belgium. Outgoing charged particles were detected in three large silicon strip detector arrays covering polar angles 4°-8°, 13°-53° and 115°-160° (the total solid angle was $\Delta\Omega\approx$ 3.5 sr).

A large number of excess neutrons in the ^{6}He+^{14}C reactions is particularly suitable for a study of neutron-rich isotopes of beryllium and carbon, while zero spins of both beam and target particles provide a significant advantage for the spin and parity assignments of the detected exotic states. Several exit channels are being investigated using single events and both double and triple coincidences. The preliminary results on structure of the excited states in ^{10}Be, ^{12}Be, ^{14}C and ^{16}C would be shown, as well as the results for elastic and inelastic scatterings and various transfer reactions.

References

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