Structure and reactions of light nuclei studied with ^{6}He beam

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The ^{6}He nucleus is known [1] to have a rather exotic halo structure, with two valence neutrons and an alpha-particle core. Recent development of low-energy radioactive beams enabled use of such a loose projectile in studies of other neutron-rich light nuclei through different transfer reactions.

Experimental studies performed with the ^{6}He beam in Louvain-la-Neuve, Belgium, will be summarised. The results of measurements with the ^{6}Li, ^{7}Li, ^{9}Be, ^{12}C and ^{16}O targets at the ^{6}He beam energies E=17-35 MeV will be presented and discussed. In all experiments the detector set-up consisted of highly segmented silicon strip detector arrays covering a total solid angle higher than several sr.

Elastic and inelastic scatterings, transfer reactions, quasi-free scattering and sequential decay processes were studied yielding interesting results on both cluster structure of different nuclei and reactions mechanism involved. For example, the conclusive evidence for existence of very deformed molecule-like states in ^{10}Be was found via ^{6}He+^{6,7}Li sequential decay reactions (and afterwards confirmed with the ^{6}He+^{4}He resonant elastic scattering [3]). Clustering of some ^{9}Be and ^{14}C states was also studied, as well as some exotic transfer reactions, like (^{6}He,^{8}Be) [4]. In conclusion, the ^{6}He beam was found to be an excellent choice for studies of light exotic nuclei.

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