Pionic fusion study of the halo nucleus ^{6}He in the reaction d + ^{4}He $\rightarrow$ ^{6}He + π^+ at CELSIUS

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The halo nucleus ^{6}He has been studied in a pionic fusion experiment at the CELSIUS storage ring facility in Uppsala. The ^{6}He nuclei were produced in reactions with a deuteron beam incident on a ^{4}He jet target 0.9 - 5.4 MeV above threshold in the centre-of-mass frame. The ^{6}He ions were detected in a ΔE - E solid-state detector telescope inserted into the CELSIUS ring [1].

The aim of the experiment was to investigate the high momentum part of the halo wave function by measuring the total and differential cross-sections of the reaction d + ^{4}He $\rightarrow$ ^{6}He + π^+. The isobaric analogue state of the ground state of ^{6}He in ^{6}Li at 3.56 MeV excitation energy, has been studied earlier in a similar experiment [2]. The results from this measurement have been shown to be sensitive to the structure of the halo.

Preliminary results will be presented and compared to the results for ^{6}Li*.

References

[1] Chr. Bargholtz et al., Nucl. Instr. Meth. A **390** (1997) 160.
[2] M. Andersson et al., Phys. Lett. B **481** (2000) 165.