Contribution ID: **9** Type: **Submitted**

MAGISOL decay-experiments 2015

Friday 4 December 2015 10:30 (15 minutes)

On behalf of the MAGISOL, the IS507 and the IS541 collaborations

I will present preliminary results from two decay-experiments, which were performed by the MAGISOL collaboration at ISOLDE in 2015.

The first experiment was a decay-study of ^{20,21}Mg performed at the ISOLDE decay station. The beta-decays of ^{20,21}Mg provide information about the beta-strength functions to states in ^{20}Na and ^{21}Na. Such information is important for comparison to the nuclear shell model, and to the strengths to similar transitions in the mirror nuclei. For ^{20}Mg there is an additional interest in determining the spin and parity of the 2.65 MeV proton unbound resonance in ^{20}Ne. This is important for the hot CNO breakout sequence ^{15}O$(\alpha,\gamma)^{19}$Ne(p,γ)^{20}Na towards the rp-process such as e.g. found in X-ray bursts. A part of the IS507 experiment was already performed in 2013 and the results were presented at the workshop last year. Analysis of the first set of data has revealed several new decay channels in ^{21}Mg. This includes both new beta-delayed proton branches and, for the first time, beta-delayed alpha emission branches [1,2]. Similar decays are expected in ^{20}Mg including βpα and $\beta\alpha$p decays to ^{15}O. I will present results from the first attempts to see these decays.

The aim of the second experiment was to determine the branching ratio for the beta-delayed proton emission in ^{11}Be. The experiment was performed at LA1 and was the second part of the IS541 experiment, the results from the first experiment can be found in [3]. Beta-delayed proton emissions are rarely observed in neutron-rich nuclei and ^{11}Be is expected to be one of the best candidates for such a decay because of the halo structure. The branching ratio in ^{11}Be is estimated to be in the order of 10^{-8}, much lower than the $(8.3 \pm 0.9) \cdot 10^{-6}$ measured in our first experiment [3]. The energy of the emitted proton is very small and instead of measuring the protons, the ^{11}Be nuclei are implemented in a copper-foil and the amount of ^{10}Be is then determined in an AMS measurement afterwards. The amount of implanted ^{11}Be and any contamination leading to additional ^{10}Be in the sample have to be determined to a high precision, due to the very small branching ratio. I will present the status of the determination of the implanted nuclei including a HRS scan from ^{10}Be to ^{11}Li. This is one of the first measurements of this profile at ISOLDE.

[1] M. V. Lund *et al.*, EPJ **A51** (2015) 113

[2] M. V. Lund *et al.*, Phys. Lett. **B750** (2015) 356

[3] K. Riisager *et al.*, Phys. Lett. **B732** (2014) 305

Author: JOHANSEN, Jacob (Aarhus University (DK))

Presenter: JOHANSEN, Jacob (Aarhus University (DK))

Session Classification: Hyperfine Interactions & Beta Decay Studies