The ^{88}Sr$(\vec{p},\alpha)^{85}$Rb Reaction at 24.6 MeV

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From the weak coupling of the $2p_{1/2}$ spectator proton with the low-lying states of ^{85}Rb multiplets of homologous states are expected to arise in the ^{86}Sr nucleus. Preliminary shell model calculations [1,2] predicted the occurrence of states in ^{86}Sr with a structure similar to that of parent states in ^{85}Rb. Therefore the core ^{88}Sr$(\vec{p},\alpha)^{85}$Rb reaction is studied and the ^{89}Y$(\vec{p},\alpha)^{86}$Sr reaction will be studied to aid in the identification of weak coupled states via the comparison of cross section and asymmetry angular distributions.

The ^{88}Sr$(\vec{p},\alpha)^{85}$Rb reaction has been measured for the first time at 24.6 MeV incident proton energy from the Stern-Gerlach atomic beam source of negative polarized Hydrogen ions. The proton beam current intensity was up to 1.7 μA and the beam polarization (60±3)%. The target consisted of ^{88}SrO 59 μg/cm^2 thick (enrichment 99.9%), evaporated on 14 μg/cm^2 carbon backing.

The reaction products have been analyzed with the Q3D magnetic spectrograph and detected in his focal plane by a multiwire proportional chamber with readout of a cathode foil structure for position determination and ΔE-E particle identification [3]. The resolution of the resulting α spectra is 12 keV FWHM and the background is negligeable. Angular distributions of cross sections and asymmetries are obtained from spectra at 8 different laboratory angles (10^o, 15^o, 20^o, 27.5^o, 35^o, 42.5^o, 50^o, and 57.5^o), in two different magnetic settings, allowing for reaching an excitation energy of the ^{85}Rb residual nucleus about 2 MeV. In Figure 1 α-particle spectra for ^{88}Sr$(\vec{p},\alpha)^{85}$Rb and ^{89}Y$(\vec{p},\alpha)^{86}$Sr reactions are reported. The low-lying levels of ^{85}Rb up to 2 MeV of excitation energy and those of ^{86}Sr up to 3.9 MeV of excitation energy are indicated. To provide the energy calibration of the ^{85}Rb and ^{86}Sr spectra the ^{90}Zr(p,α)^{87}Y reaction has been used.

References

[1] A. Vitturi et al., Annual report 2001, p. 7
[2] A. Vitturi et al., Annual report 2001, p. 8
[3] H.-F. Wirth et al.,Annual report 2001, p. 71

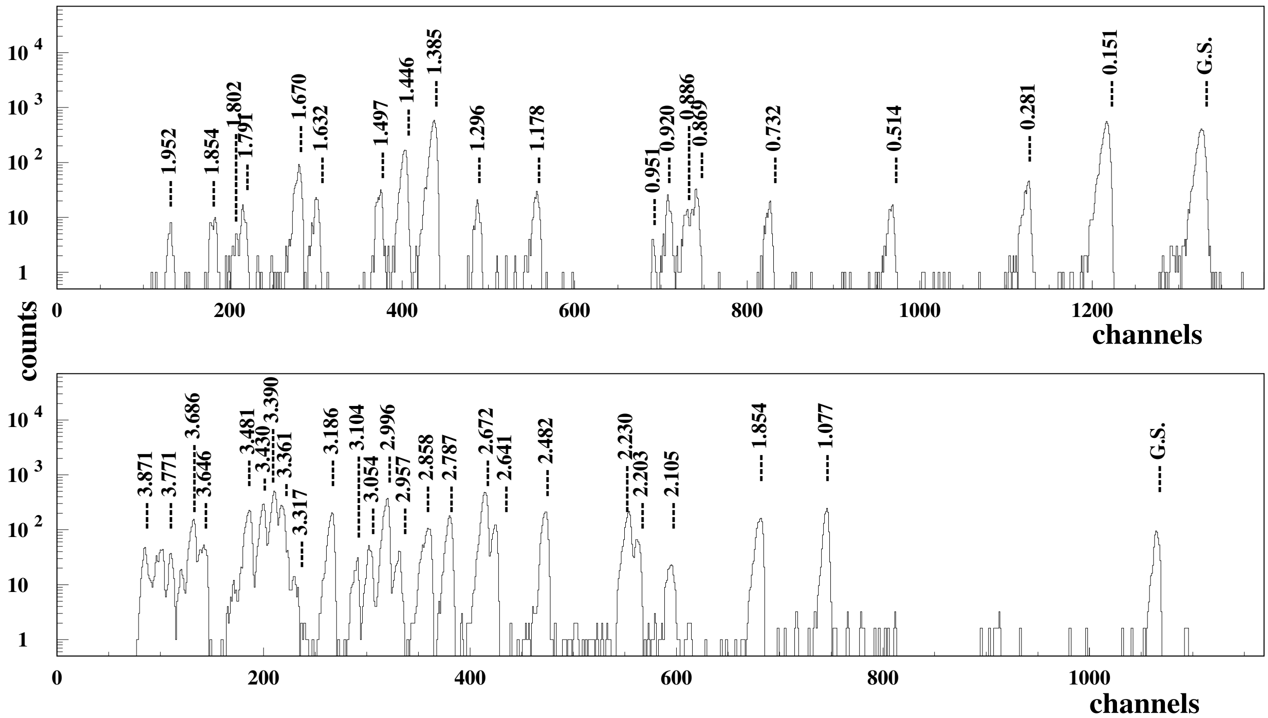

Fig. 1: Top: the α-particle spectrum at θ=20^o for ^{88}Sr$(\vec{p},\alpha)^{85}$Rb is shown. Bottom: the test spectrum at θ=25^o for ^{89}Y$(\vec{p},\alpha)^{86}$Sr.