^{116,114}Sn(p,t)^{114,112}Sn Reactions

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Recently shell model calculations with realistic effective interactions have been performed for the neutron-deficient tin isotopes [1] and are now extended to the whole isotopic chain in order to access the role of realistic interactions in medium and heavy-mass nuclei.

In this regard the two isotopes ^{112}Sn and ^{114}Sn are of special interest. For them a weak shell closure seems to exist in correspondence to the filling of the $d_{5/2}$ and $g_{7/2}$ s.p. levels.

The ^{116,114}Sn(p,t)^{114,112}Sn reactions have been studied at 25 MeV incident energy with an intensity of 250 nA on the target, using the proton beam of the Munich Tandem accelerator, the Q3D magnetic spectrometer and the high resolution focal plane detector with periodic readout.

The thickness of the ^{116}Sn target (enrichment 96.8 %) was 100 μg/cm^2 on a carbon backing of 5.6 μg/cm^2 and that of ^{114}Sn (enrichment (71.1±1.4) %) 98 μg/cm^2 on a carbon backing of 16 μg/cm^2.

Angular distributions have been measured from 6° up to 65°.

Due to the low enrichment of the ^{114}Sn target, the energy spectra of ^{112}Sn are contaminated by the contribution of the other tin isotopes present in the target. To safely identify the ^{112}Sn levels we used for comparison the energy spectra from a target obtained by evaporating ^{114}Sn and natural Sn, with thickness of 68 μg/cm^2 and 41 μg/cm^2, respectively.

In fig. 1 the angular distributions for the transition to some ^{114}Sn and ^{112}Sn states are reported.

The spin and parity attributions were performed by means of an analysis in the framework of the DWBA in a finite range approximation, using the code TWOFNR [2].

References

[1] F. Andreozzi *et al.*, Phys. Rev **C54** (1996) 1636

[2] M. Igarashi, computer code TWOFNR (1977), unpublished

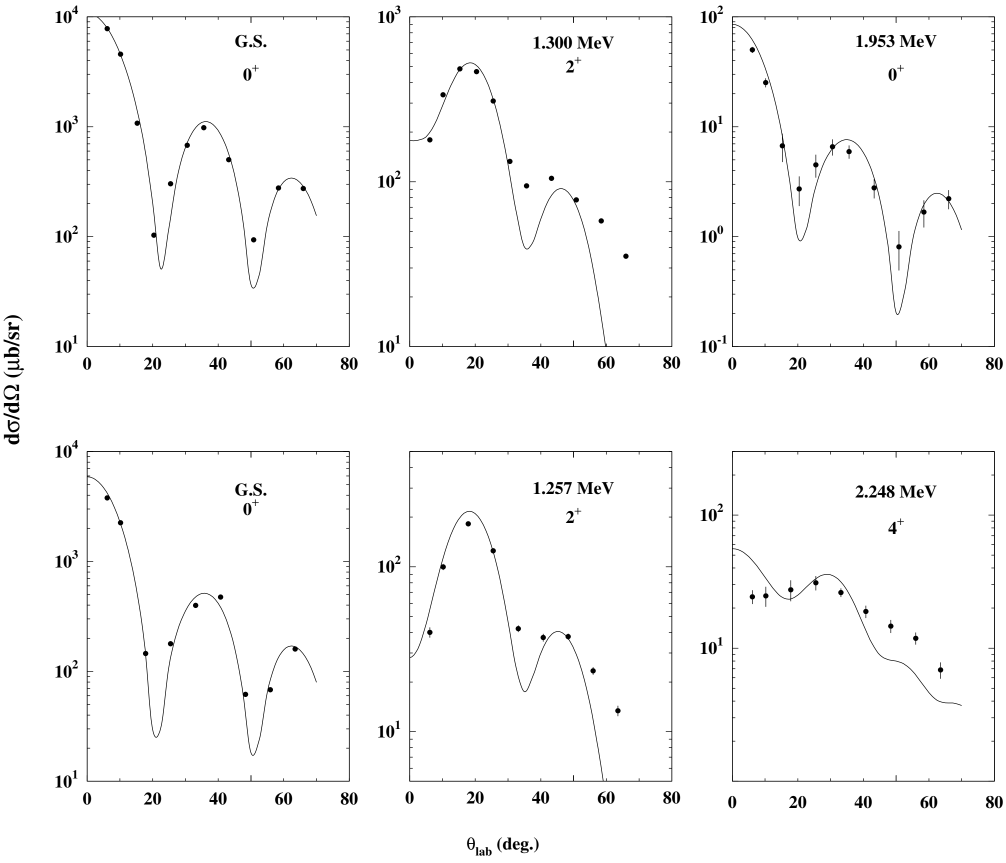

Fig. 1: Sample angular distributions for ^{114}Sn (top) and ^{112}Sn (bottom) levels, compared with DWBA calculations