The ^{91}Zr(p,t)^{89}Zr Reaction

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The ^{91}Zr(p,t)^{89}Zr reaction is studied at 25 MeV bombarding energy using the proton beam from the Munich University MP tandem accelerator.

Accurate measurement of the differential cross sections for about 40 transitions in the ^{89}Zr nucleus up to an excitation energy of about 3.400 MeV, in a high resolution experiment, allows us to determine for many levels the angular momentum transfer and consequently the parity, and to confirm and identify the spin value for some levels.

The DWBA analysis of the experimental angular distributions has been carried out in the frame of a semi-microscopic dineutron pick-up theory and in finite range approximation, using the TWOFNR code [1].

The proton entrance channel parameters are deduced from ref. [2] and for the triton exit channel from ref. [3], slightly adjusted in order to have a better agreement with the shape of the experimental differential cross sections.

A significant number of transitions with a little angular structure are reproduced quite well in terms of a mixing of L transfers allowed by a non zero-spin target, weighted by a (2L+1) factor. In the figure a sample of these fits is reported together with examples of good quality fits obtained by DWBA calculations, with a dominant L-transfer value.

References

[1] M. Igarashi, TWOFNR code (1977) (unpublished).
[2] Y. S. Park *et al.*, Phys. Rev. **C7** (1973) 445
[3] R. A. Hardekopf *et al.*, Phys. Rev. Lett. **35** (1975) 1623