The ^{194}Pt(α,d)^{196}Au Reaction ◇

H.-F. Wirth, Y. Eisermann, R. Hertenberger, and G. Graw

The (α,d) measurement to ^{196}Au is part of our program of complete spectroscopy of the quartets of nuclei whose structure might be related by supersymmetry [1]. There are strong efforts to describe the transfer matrix of the deuteron transfer reactions and to calculate theoretical cross sections [2]. To test the calculations we want not only to provide experimental data on the deuteron pickup (d,α) but also on the opposite reaction (α,d).

We measured the deuteron stripping reaction at the Q3D magnetic spectrograph at a lab. angle of 20 degrees with 36 MeV alphas (12 MeV Tandem terminal voltage). The α beam was produced by the Stern-Gerlach ion source and had an intensity of 900 nA on the target. The target consisted of 64 μg/cm^2 higly enriched ^{194}Pt evaporated on a 7 μg/cm^2 carbon backing. The outgoing deuterons were detected and identified in our cathode strip detector in the Q3D focal plane. The cross sections of the reaction are very small. The most intense line at 213 keV has an absolute cross section of only 5 μb/sr. To reduce the influence of background lines (most probable stemming from (α,d) reactions on the backing of the target) we had to close the x-slits of the spectrograph and to use only half of the possible acceptance solid angle of the Q3D. So the statistics is quite poor. The 213 keV peak has only 375(22) counts content after a measuring time of 13 hours.

We plan to do the ^{194}Pt(α,d)^{196}Au reaction again with a slightly thicker self-supporting target without carbon backing. This should reduce the background and we hope to get a clean spectrum with higher statistics. To our knowledge spectra or results of (α,d) reactions were not published so far. This empasizes the importance of our measurement.

References

[1] H.-F.Wirth *et al.*, Annual report 2001, p. 14
[2] A. Frank, R. Bijker, private communication (2003).

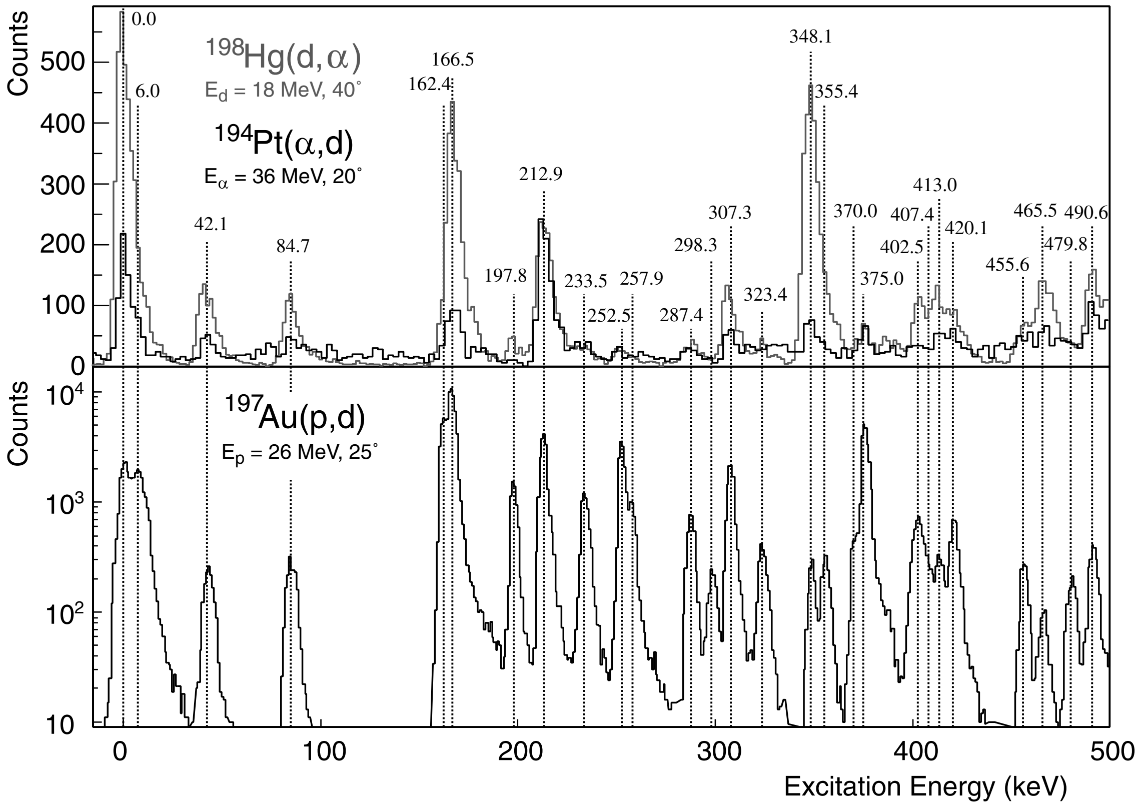

Fig. 1: Spectra of three different transfer reactions leading to ^{196}Au. The (α,d) spectrum is enlarged for a better comparability (see text). The peaks are labeled with their energy in keV, resulting from the (p,d) measurement.

◇ supported in part by the DFG under C4-Gr894/2-3.