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1.29 Effective Interactions, Analyzing Power and Nuclear Structure: a case study.

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The description of analyzing power data is sensitive both to details of the effective interaction and the nuclear structure involved. The effective interactions based on the G-matrix[1,2] for bound particles seem to provide a good starting point in the description of inelastic scattering data. Corrections to these interactions are thus expected and actually proposed for the isovector tensor term[3] and the $V_{\sigma\tau}$ term[4]. A test of these corrections in other cases is, of course, of importance in order to get some confidence in the resulting total interaction. Once this is established one can use this interaction to study nuclear structure.

We have tested the G-matrix of ref. 2 (GP) and its corrections in the excitation of the 7^- state at E_x = 4.366 MeV in the ^{88}Sr(p, p') reaction at E_p = 65 MeV, using the model wave function of ref. 5. The excitation of this state is dominated by a proton $f_{5/2} \rightarrow g_{9/2}$ transition. The calculated analyzing power is sensitive both to the $V_{\sigma\tau}$ and $V_{T\tau}$ terms. By comparing with the data we have a check on the viability of their corrections. This resulted in a very good description of the analyzing power and the shape of the cross section when both corrections were used (fig. 1). It was found also that contributions from ground state correlations and core polarization in the transition density were essential in this calculations.

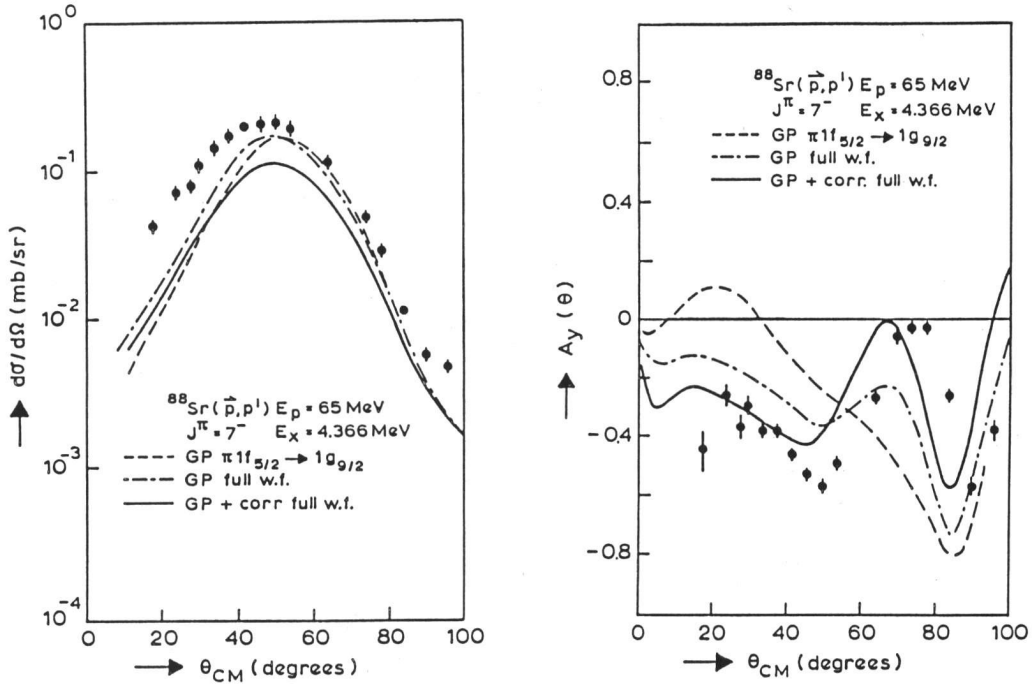

Fig. 1. Cross section and analyzing power data and calculations showing the influence of a refined nuclear structure and corrections to the interaction.

The corrected G-matrix can now be used with some confidence to determine the transition density of the excitation of e.g. the 1^+ state at E_x =3.486 MeV in the same experiment. Using the wave function of ref. 5, we found a large deviation between both calculated cross section and analyzing power and the experimental data. It was suggested[6] that some terms in the transition density were missing in nuclear structure calculations performed thusfar. Work in this direction is in progress for obtaining a better agreement with the data.

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