elements. Introduction of a g-boson using the methods of Van Isacker et al.,[2,3] however, allows reproduction of our results with relatively modest (10-12%) admixtures of g-boson configurations in low-lying states. Unfortunately, our single experiment yields only three data points (the three E4 matrix elements) whereas the model, even in its simplest form, contains four parameters (three effective charges, one hamiltonian parameter) to which these matrix elements are sensitive. As already mentioned, however, $^{192}$Os is only the first in a survey of these nuclei; the $^{194}$Pt(p,p') experiment has been approved by the PAC and will soon be performed.

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2) P. Van Isacker et al., Nucl. Phys. A380, 383 (1982).
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## $^{154}$Sm, $^{166}$Er, $^{176}$Yb, $^{182}$W($\vec{p}$,p') REACTIONS AT 134 MeV

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Our study of the $^{154}$Sm, $^{166}$Er (p,p') reactions at 134 MeV was published[1] this past year. The cross section and asymmetry data are well described by a coupled channels analysis for scattering from a deformed optical model potential within a rigid rotor model framework. The angular distributions of cross sections were also investigated using an analytic eikonal approximation model developed by Amado and co-workers,[2] from which satisfactory descriptions were obtained as well as insight into the relative contributions of single-step and multi-step excitations.

We also found that the multipole moments of the real potential are in good agreement with measurements using other reactions but that there might be energy dependences. The hexacontatetrapole deformation parameter, $\beta_6$, was found to be positive for $^{154}$Sm and negative for $^{166}$Er, in agreement with the predictions by Nilsson et al.[3]

To investigate further the trend of $\beta_6$ in this mass region as well as other coupled channel effects we extended our study to $^{176}$Yb and $^{182}$W using the same reaction. Elastic and inelastic scattering measurements were made at the QDDM spectrometer using the 134 MeV polarized proton beam. Angular distributions of cross sections and asymmetries for ground band states having $J^{\pi}=0^+$ through $8^+$ ($6^+$ in the case of $^{182}$W) were measured at laboratory angles from 22° through 42° in 2° steps and then through 77° ($^{176}$Yb) or 79.5° ($^{182}$W) in 2.5° steps. Typical spectra are shown in Fig. 1. Peak fitting has been performed for the rotational states in both these nuclei and

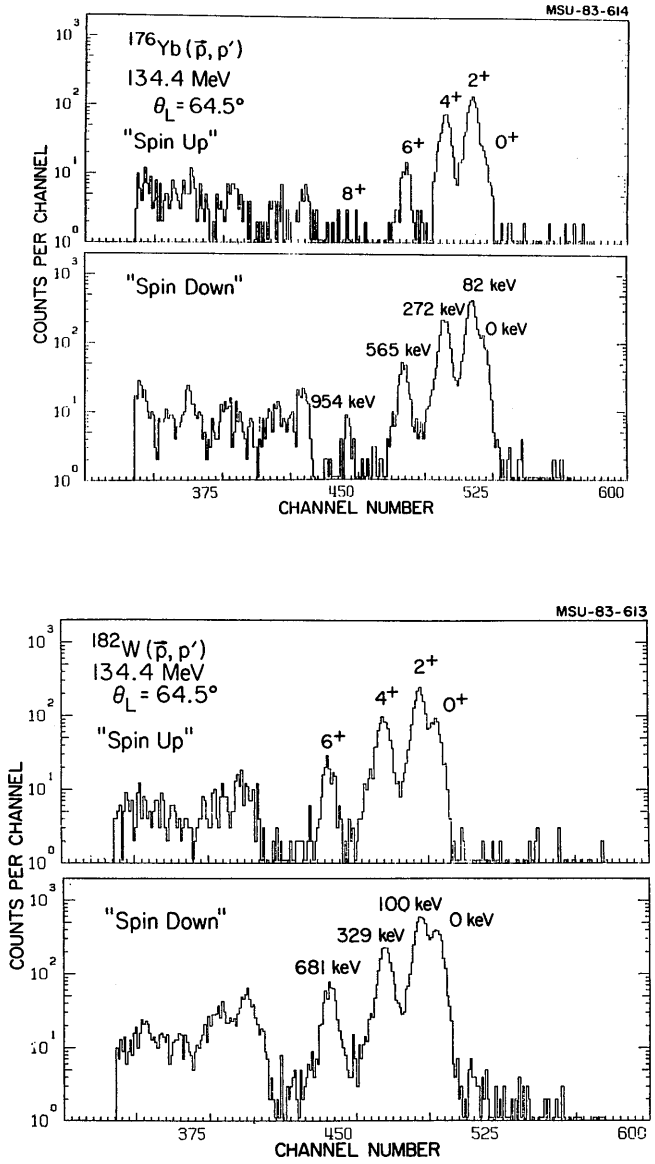


Figure 1. Spectra from the $^{176}$Yb, $^{182}$W(p,p') reactions at 134 MeV. "Spin Up" and "Spin Down" data are shown for $\Theta_{lab}$ = 64.5°.

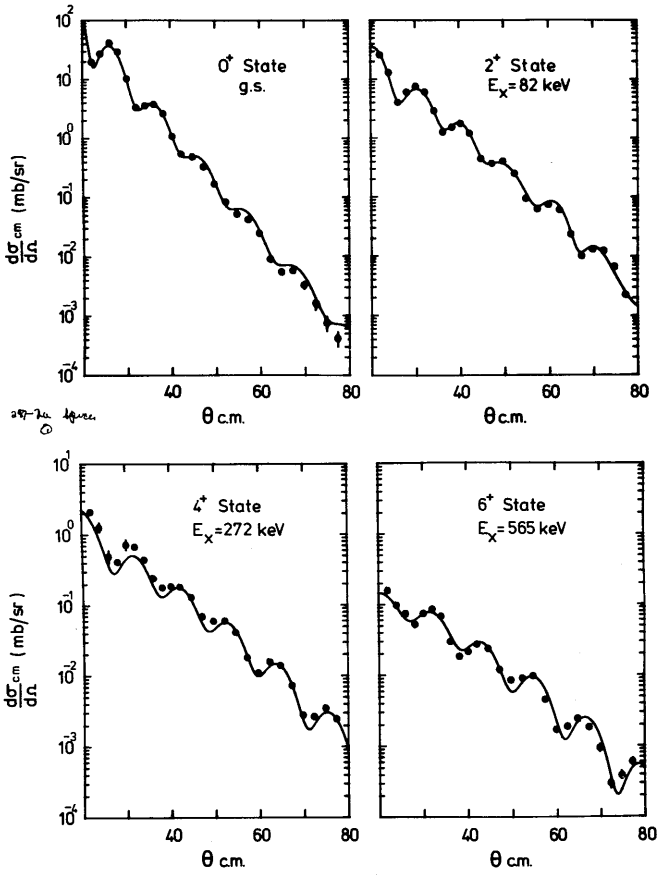


Figure 2. Differential cross sections for proton groups populating the $0^+$, $2^+$, $4^+$ and $6^+$ states of the $^{176}$Yb ground state rotational band. The curves are preliminary results of coupled-channels calculations.

differential cross section and analyzing power angular distributions have been obtained. As in the previous work,[1] the differential cross sections are highly oscillatory and display a rate of fall-off that decreases significantly as one goes from the $0^+$ to the $8^+$ state. This feature is due[1] to the transition from one-step to multi-step processes with increasing angular momentum of the final state. The analyzing powers are also highly oscillatory, and are positive reaching very close to +1 at some angles greater than 60°.

Analysis of these data is proceeding in a way similar to that used[1] for $^{154}$Sm and $^{166}$Er. The coupled channels program ECIS[4] is being used, with starting parameters taken from the final parameters found for $^{166}$Er. Preliminary ECIS fits to the $^{176}$Yb data are shown in Figs. 2 and 3.

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2) R.D. Amado, J.A. McNeil, and D.A. Sparrow, Phys. Rev. C 25, 13 (1982) and references therein.

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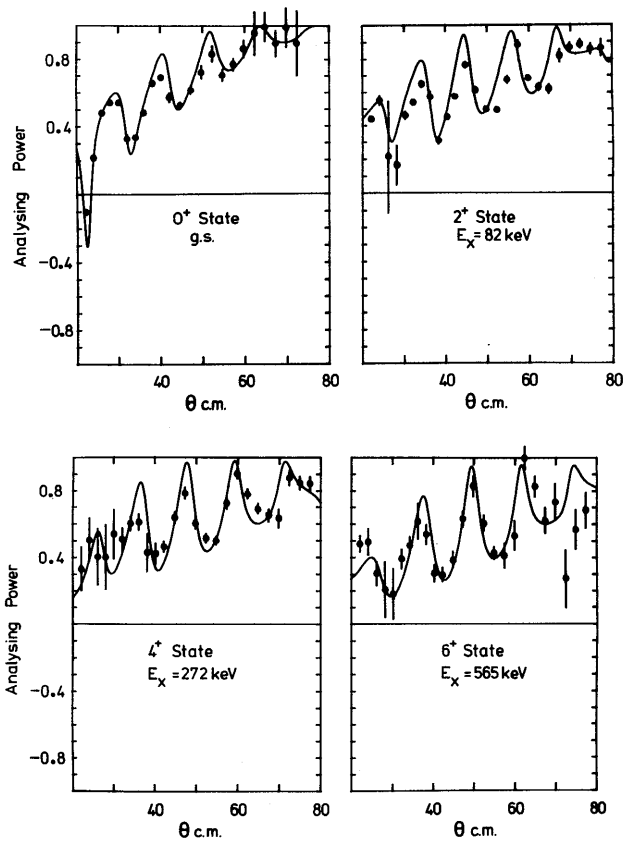


Figure 3. Analyzing powers for the proton groups populating the $0^+$, $2^+$, $4^+$ and $6^+$ states of the $^{176}$Yb ground state rotational band. The curves are preliminary results of coupled-channels calculations.