Interpretation of High Energy p-p Scattering. DON F. SWANSON,
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High energy p-p scattering has been interpreted by several
authors in terms of highly singular noncentral interactions\textsuperscript{1,2}. The
triplet state calculations were carried out in the Born approximation
and, together with the singlet, yielded an almost isotropic (c.m. system)
differential cross section. Agreement with experiment\textsuperscript{3} was good at large
angles but the theoretical peak in the forward direction, due mostly to
singlet D scattering, was too large. It is not clear however that the
Born approximation should be valid for singular potentials.

In the present analysis,
the wave equation has been integrated numerically to obtain an exact
solution at 350 Mev using the tensor interaction of Christian and Noyes\textsuperscript{1}.
A "square wall" cutoff at the nucleon Compton wavelength was used. In
the case of the "repulsive" interaction, the triplet cross section agrees
closely with the Born approximation for scattering angles greater than
25° but is larger at small angles. This remarkable agreement is apparently
accidental since the 3P\textsubscript{0} and 3P\textsubscript{1} phase shifts are incorrect by orders
of 50% in the Born approximation. The "attractive" triplet cross section
is about 30% larger at 30° than at 90°, and is therefore inconsistent
with the experimental data even at large angles. The influence of the
cutoff is under further study. The exact phase shifts here obtained will
be used to calculate polarization effects in a double p-p scattering.

\textsuperscript{1} R. S. Christian and H. P. Noyes, Phys. Rev. 72, 85 (1950).
\textsuperscript{3} Chamberlain, Sagre, and Wiegand, Phys. Rev. 82, 923 (1950).