A widening of the beam due to straggling in the iron is estimated to be negligible for particles of such high energy. Calculation shows that by choice of suitable geometrical conditions and under the assumption of a magnetic induction of 20,000 over a 15 cm path a deflection equal to the width of the beam (about 8 cm) can be obtained for β-particles with the assumed energy of 10^9 e-volts. A somewhat smaller but still detectable deflection can be expected for protons of the same energy. Intensity considerations indicate that under these conditions the number of true triple coincidences will be sufficient to be measurable by a few hours of registration and that the number of such coincidences occurring by chance can be reduced to a small fraction of the true ones.

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Magnetic Moment of the Sulfur Molecule

It is perhaps an open question as to whether the oxygen molecule is singly or doubly bound. According to Heitler and London the $^3\Sigma$ state indicates a singly bound molecule but Heitler and Herzberg have suggested that the second valence may reside in the exchange degeneracy of the electron orbits without involving the spins.

In the case of the sulfur molecule S_2 the evidence is more definite. Sulfur does not often form double bonds, and the fact that sulfur is a solid at ordinary temperatures and even in the vapor state is largely polymerized, indicates that the S_2 molecule is highly unsaturated. A $^3\Sigma$ state is to be expected.

The magnetic moment of the S^2 molecule has been determined in this laboratory and the prediction is confirmed. Since most of the S_2 molecules are in states of high rotational energy it would not be expected that the field would break the coupling between the spins and the rotational axis. Under these circumstances only a widening of the molecular beam in the inhomogeneous field would occur and this result has been obtained in the experiments. In some cases however a faint satellite line on the side of the broadened central image has been observed. This line is on the side next the knife edge where the field is strongest. It seems probable that the field is strong enough here to uncouple the spins from the rotational axis in those mole cules in the lower rotational states. If this is the case then the line is one of the three to be expected from a $^3\Sigma$ molecule with strong field quantization.

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Raman Spectra from Sulfur Dioxide

In view of the increasing interest which is being shown in the spectra of polyatomic molecules, we desire to report the results of some Raman effect measurements on sulfur dioxide. The material used was taken from a commercial tank; it was passed over phosphorus pentoxide to dry it and then condensed in a heavy walled Pyrex glass tube 2 cm in diameter and 20 cm long. During the condensation care was taken to exclude moisture; but no further purification than drying was considered necessary since the commercial product is ordinarily much better than 99 percent pure. When this glass tube was nearly filled with liquid, it was sealed off and subsequently used for the light-scattering experiments.

The Raman spectra were obtained with a mercury arc and the plates calibrated with

TABLE I. *Scattered lines from liquid* SO_2.

Frequency of modified line	Intensity	Frequency of exciting line	Frequency shift
24182.5	v.f.(diffuse)	24705.5	523.0
23560.4	st.	24705.5	1145.1
23371.2*	med.	24516.1	1144.9
23366.1*	weak (diff.)	24705.5	1339.4
22412.5	weak (diff.)	22938.1	525.6
21893.7	v.f.	23039.1	1145.4
21847.8	f.	22995.3	1147.5
21791.4	v.st.	22938.1	1146.7
21597.4	med. (diff.)	22938.1	1340.7

* These two lines overlapped on the plates; separate measurement was attempted since one line was much sharper than the other.