	V MeV	W MeV	r_0 f	a f	r_0' f	a' f
^{3}He	128	15.4	1.021	0.850	1.815	0.626
α	75	12.0	1.743	0.558	1.743	0.558

Fig. 1. Distorted wave $l=0$ and $l=2$ angular distribution fits to the 2·791/2·797 and 2·87 MeV "triplet" in the reaction ^{22}Ne(^{3}He,α)^{21}Ne at $E(^3$He)$=9·744$ MeV (lab.). The optical model parameters used are shown.

Thus it seemed likely that both members of the 2·80 MeV doublet were $J^\pi = 1/2^+$ states. A more recent study[13] of γ–γ and n–γ angular correlations from the reaction ^{18}O(α,nγ)^{21}Ne, however, gives very strong evidence for an assignment of $J = 3/2$ to the 2·791 MeV state. This experiment also confirms that $J = 9/2$ for the state at 2·87 MeV. Thus the other possible spin allowed previously[4–8], namely $J = 5/2$, can now be eliminated.

In the present experiment, a study of the reaction ^{22}Ne(^{3}He,α)^{21}Ne was undertaken to test the validity of the Nilsson model description of neon-21. The angular distribution shown in Fig. 1 corresponds to the unresolved group of the three states discussed here. It was analysed by the DWBA using the code DRC[14]. Fig. 1 shows the DWBA calculations for both $l=0$ and $l=2$ angular momentum transfers. The optical model potentials and cut-off radius are identical to those used by us in the analysis of the angular distributions for the ground state and first excited state of neon-21. The calculations clearly indicate an $l=2$ transition, the contribution from an $l=0$ transition being, apparently, negligible. This $l=2$ transition indicates either a $J^\pi = 3/2^+$ or $5/2^+$ state. Thus the present experiment is consistent with the latest 3/2 assignment to the 2·791 MeV state[13] and, further, indicates that it is a positive parity state.

A similar measurement has been carried out at 15 MeV (C. M. Fou, personal communication) and preliminary analysis also indicates $l=2$ for the transition.

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CHEMISTRY

Initiation of the Hydrogen Chlorine Reaction by Red Laser Light

DURING a recent discourse at the Royal Institution[1], I wished to illustrate the effect of Q switching on the peak intensity of light emitted by a pulsed ruby laser and also to demonstrate the occurrence of intensity dependent two quantum processes. This was achieved in a simple and striking manner by using the best known of all photochemical demonstrations, the hydrogen chlorine explosion.

When a pulse from a ruby laser, of energy 30J, was projected across the theatre and focused onto a vessel containing hydrogen and chlorine at a total pressure of 1 atm., no reaction was observable, nor was any reaction expected because chlorine is transparent to the red light of the ruby laser which emits at 6943 Å. When the experiment was repeated with no change in the arrangement except for the interposition of a cell containing kryptocyanine dye between the laser rod and the mirror, the characteristic explosion of hydrogen and chlorine occurred.

The kryptocyanine Q switch reduces the total energy output of the laser pulse by a factor of ten and the effect must therefore be attributed to the increased intensity of the 20 nsec pulse which is emitted under Q switched conditions. The process of two quantum absorption which is proportional to the square of the intensity will therefore be greatly increased when the Q switch is inserted.

The two quantum process is equivalent to absorption of a quantum of wavelength 3476 Å, which is near to the first absorption maximum of molecular chlorine and is known to lead to dissociation. Although similar two quantum processes have been observed in systems where an intermediate energy level is available[2], the chlorine system seems to be a clear case of a gaseous photochemical reaction induced by true frequency doubling.

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Purification of the Optical Antipodes of α-Arylalkylamines by the Formation of Clathrates

THE classical methods for resolving amines such as α-phenylethylamine[1,2], α-(p-tolyl) ethylamine[2,3], or α-phenylpropylamine[4] into their optical antipodes involve salt formation with a naturally occurring acid such as d-tartaric or d-camphoric acid. By these methods, one of the antipodes can usually be isolated in a pure state by successive crystallizations of the less soluble diastereoisomeric salt. The antipode remaining in the mother liquor, however, is always contaminated by the other and another resolving agent is necessary for further purification. Theilacker[1] has purified d-α-phenylethylamine by sulphate formation; we did not, however, obtain the same result with other α-arylalkylamines. In most cases, the isolation of d-amines by these methods requires the use of expensive reagents such as l-malic acid.

We have now found that the optical isomers of most α-arylalkylamines can be efficiently purified through clathrate formation by their co-ordination complex [Ni (NCS)$_2$ (α-arylalkylamine)$_4$]. It is known that complexes of this type are used to form clathrates with a wide variety of aromatic compounds[5–7]. These clathrates can be formed simply by mixing an aqueous solution of nickel