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OBSERVATION AND ANALYSIS OF ION-PAIR TRANSITIONS OF I₂ COOLED IN A SUPERSONIC FREE-JET EXPANSION

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The A' state of I₂ was observed for the first time in a free-jet expansion, where it was prepared by ArF laser excitation of I₂/Ar mixtures close to the nozzle^a. Twenty-seven bands in the v'' = 0 progression of the D' - A' transition were studied by laser excitation spectroscopy, leading to the following improved constants (cm⁻¹) for the A' and D' states:

$$B_0'' = 0.028054, B_0' = 0.020526, \alpha_c' = 5.3 \times 10^{-5}, \\ \omega_c' = 103.953, \omega_c x_c' = 0.2097, \omega_c y_c' = 2.687 \times 10^{-4}.$$

Many bands of the β - A transition have also been observed. These originate from A, v'' = 0, and terminate on levels with 25 ≤ v' ≤ 68 of the β state. Full analyses of both band systems will be presented.

^aJ. Tellinghuisen, S. Fei, X. Zheng, and M.C. Heaven, Chem. Phys. Lett. 176, 373 (1991).

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