Two band systems of the FeF radical have been recorded at Doppler-limited line widths by Laser Induced Fluorescence. The (0,0) band of the $^6\Pi - X^\Delta$ was recorded at 323 nm. The system at 330 nm consisted of an overlap of the (1,0) band of the $^6\Pi - X^\Delta$ system and the (0,0) band of the $^6\Phi - X^\Delta$ system.

FeF was produced in a continuous flow by the reaction of fluorine atoms, produced by a microwave discharge of fluorine in helium, with iron pentacarbonyl. This reaction provides data for the lowest four sub-bands of each system, considerably extending our knowledge of these two electronic transitions compared with previous work by Pouilly et al. The temperature of the sample in our experiments is slightly above ambient, about 450 K.

The results have been analysed and combined with the millimeter-wave spectra for the ground state, $^6\Delta$, to produce better parameters for the excited states.

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