NON STATISTICAL HYPERFINE POPULATION DISTRIBUTION OF I(^{2}P$_{1/2}$) UPON PHOTOLYSIS OF I$_2$ VIA THE B^{3}Π(O$_u{}^+$) STATE

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A non statistical hyperfine population distribution was detected for I(^{2}P$_{1/2}$) after photolysis of I$_2$ via the B^{3}Π(O$_u{}^+$) state. Dissociation of a homonuclear diatomic from an unperturbed electronic state will result in a statistical population of the atomic hyperfine levels. For direct dissociation of I$_2$(B), the I(^{2}P$_{1/2}$) F=2 and F=3 levels are expected to show a population ratio of 5/7 (N(F=2)/N(F=3)). However, an investigation of the hyperfine population distribution on the photolysis energy revealed a strong dependence with population ratios reaching 8/1 with photolysis energies near the I$_2$(B) dissociation limit. It is believed that avoided crossings between the potential energy curves of I$_2$ at large internuclear distances are responsible for the non statistical hyperfine population distribution.