FINE-STRUCTURE PREDISSOCIATION OF ULTRACOLD PHOTOASSOCIATED $^{39}K_2$ MOLECULES

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We report the first observation of fragmentation spectra of the fine-structure predissociated long-range 1_g and 0_u^+ state of ultracold (T - 350μK) $^{39}K_2$ molecules. The 1_g state predissociates via the curve crossing at long range with the repulsive 0_g^+ state. The 0_u^+ state, however, predissociates predominantly through molecular fine-structure mixing at short range with the $b^3\Pi_{1u}$ component. Our technique of fragmentation spectroscopy is a sensitive and selective tool for studies of ultracold photoassociation and fine-structure-changing collisions.