DC Slice imaging of O(1D2) alignment and orientation in ozone photodissociation

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We present the absolute velocity-dependent orbital alignment and orientation for O(1D2) produced in the 266 nm photodissociation of ozone obtained by DC slice imaging. The results are analyzed in terms of laboratory frame anisotropy parameters describing distinct excitation and dissociation mechanisms and possessing characteristic angular distributions. The results show strong orbital alignment, consistent with previous work by Houston and coworkers, that originates mainly in incoherent parallel excitation but shows incoherent and coherent perpendicular contributions as well. The alignment shows relatively little recoil speed dependence. Strong orbital orientation is also observed, and this varies dramatically with O atom recoil speed. The orientation arises via coherent parallel and perpendicular excitations induced by linearly polarized light.