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### **Dynamic Stark Control of Photochemical Processes<sup>1</sup>**

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A technique for controlling the outcome of photochemical reactions using the dynamic Stark effect due to a strong, nonresonant infrared field is demonstrated numerically and experimentally. A precisely timed infrared laser pulse is used to reversibly modify a potential energy barrier during a chemical reaction without inducing any real electronic transitions. Dynamic Stark control (DSC) is experimentally demonstrated during the nonadiabatic photodissociation of IBr. Significant modification of reaction channel probabilities are observed. The DSC process is nonperturbative, insensitive to laser frequency, and affects all polarizable molecules, suggesting broad applicability.

<sup>1</sup>In collaboration with Dave Townsend, Misha Yu. Ivanov, and Albert Stolow, National Research Council of Canada.