

Abstract Submitted  
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**On dynamical symmetry breaking in the CO<sub>2</sub> molecule induced by the shaped x-ray pulses** NILAM JADAV, SVETLANA MALINOVSKAYA, Stevens Institute of Technology — Electronic symmetry selection rules are the prime conditions for resonant x-ray scattering of molecules. However in highly symmetrical molecules, these rules may be violated owing to the coupling between electronic states having different spatial symmetry by nuclear motion. We consider the CO<sub>2</sub> molecule as an example, with the Oxygen x-ray emission spectra manifesting dynamical symmetry breaking in linear molecules. This occurs owing to interactions between close lying core-excited states via asymmetric stretching vibration. The effect of pulse shapes on the population dynamics of the gerade and ungerade core-excited states in the CO<sub>2</sub> molecule is demonstrated aiming to reveal the pulse parameters that control dynamical symmetry breaking.

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