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Controlling ring currents in molecules[1] TENNESSE JOYCE, AGNIESZKA JARON-BECKER, University of Colorado, Boulder — The recent technological development of attosecond pulses with circular polarization may enable control over molecular ring currents. Besides having potential applications in nanoscale electronics and magnetism, ring currents may also be critical for quantitative, time-resolved studies of electron delocalization and aromaticity in molecules. In this talk, we introduce a control scheme whereby the dominant charge carriers for a molecular ring current can be chosen as either electrons or holes, depending on the intensity of the instigating laser pulse. As a proof-of-principle we have performed ab initio calculations using time-dependent density functional theory, which demonstrate control over ring currents in the benzene molecule by a few-femtosecond circularly polarized laser pulse. Additionally, we will discuss the role of symmetry breaking (i.e. the Jahn-Teller effect) in the subsequent field-free evolution of the molecular ring current.

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