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Steering of hydrogen migration in hydrocarbons using intense few-cycle laser fields HUI LI, MATTHIAS KUEBEL, CHRISTIAN BURGER, NORA KLING, BENJAMIN FOERG, SERGEY ZHEREBTSOV, MATTHIAS KLING, LMU and MPQ, SPYROS KAZIANNIS, University of Ioannina, ROBERT SIEMERING, REGINA DE VIVIE-RIEDLE, Depart. of Chem. and Biochem., LMU, JOHANNES STIERLE, ALEXANDER KESSEL, KELSIE BETSCH, BORIS BERGUES, SERGEI TRUSHIN, MPQ, ALI ALNASER, MPQ and American University of Sharjah, ABDALLAH AZZEER, King-Saud University, ITZIK BEN-ITZHAK, JRML, Kansas State University, ROBERT MOSHAMMER, MPI for Nuclear Physics — Structural rearrangements in hydrocarbons, namely acetylene, allene and toluene, are initiated by phase- and intensity-controlled few-cycle laser pulses. The momentum distributions of several ionic fragments are monitored using single-shot VMI and COLTRIMS. The results show that the hydrogen migration in these hydrocarbons can be steered by changing the CEP and the intensity of the few-cycle pulses. Quantum dynamical calculations performed on acetylene and allene show that a superposition of vibrational modes can be created by wave-form controlled few-cycle laser fields, which will result in a directionality of the hydrogen migration [1]. This mechanism, which appears to be of general importance for such complex molecules, should also be able to explain the molecular dynamics observed in toluene [2]. [1] M. Kübel, *et al.*, arXiv:1508.04018. [2] H. Li, *et al.*, *Struct. Dyn.* **3**, 043206(2016).

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