

Abstract Submitted  
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**Photoemission time delay in quadrupole ionization channels from free and confined xenon**<sup>1</sup> SOURAV BANERJEE, IIT-Madras, PRANAWA DESHMUKH, IIT-Tirupati, STEVEN MANSON, Georgia State University — Nondipole effects in photoionization in the past were believed to be insignificant below  $\sim 5$  keV. However, evidence of quadrupole (E2) transitions on the photoelectron angular distribution at rather low photon energies has been reported [1, 2]. Experimental studies [3, 4] have confirmed this. Studies of the quadrupole ionization from different subshells of xenon, both free (Xe), and confined (Xe@C<sub>60</sub>) [5, 6] indicate the presence of Cooper minima in E2 transitions, and important of interchannel coupling and confinement effects have been found. Photoionization time delay is of high interest, but studies of time delay in E2-channels is scanty [7, 8]. This present study reports E2 photoionization time delay for free Xe and Xe@C<sub>60</sub> to investigate temporal photoionization dynamics in nondipole transitions. [1] W. R. Johnson and K. T. Cheng, Phys. Rev. A **63**, 022504 (2001); [2] M. Ya. Amusia, A. S. Baltenkov, Z. Fel'fi and A. Z. Msezane, Phys. Rev. A **59**, R2544 (1999); [3] O. Hemmers, *et al*, Phys. Rev. Lett. **91**, 053002 (2003); [4] O. Hemmers, *et al*, Phys. Rev. Lett. **93**, 113001 (2004); [5] P. C. Deshmukh, T. Banerjee, K. P. Sunanda and H. R. Varma Radiat. Phys. Chem. **75**, 2211 (2006); [6] K. Govil and P. C. Deshmukh J. Phys. B **42**, 175003 (2009); [7] A. Mandal, S. Saha, T. Banerjee, P. C. Deshmukh, A. Kheifets, V. K. Dolmatov and S. T. Manson, J. Phys. Conf. Ser. **635**, 092097 (2015); [8] A. Kumar, H. R. Varma, P. C. Deshmukh, S. T. Manson, V. K. Dolmatov and A. Kheifets, (2016). Phys. Rev. A **94**, 043401 (2016).

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