

Abstract Submitted  
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**Wigner Time Delay for Xe 5s photoemission in the Second Cooper Minimum Region using RMCTD** AARTHI GANESAN, JBAS College, PRANAWA DESHMUKH, IIT-Tirupati, STEVEN MANSON, Georgia State University — We have examined the Wigner time delay of Xe 5s photoelectrons in the region of second Cooper minimum using the RRPA [1-3], the RRPA-R [4] and the RMCTD [5] methodologies. Atomic time delay is Wigner-Eisenbud-Smith (WES) [6-9] plus Coulomb laser coupling components. The WES component [9] is studied. Electron correlations and relativity [2-3] influence WES time delay strongly near Cooper minima, resonances, etc. Xe 5s time delay near the first Cooper minimum was studied earlier [2-3], but a second Cooper minimum exists at  $\sim 150$  eV [10]. The Xe 5s photoelectron angular distribution, using the RMCTD methodology agrees better with experiment [11] compared with RRPA or RRPA-R results. Since the angular distribution depends on the phases of matrix elements, this suggests that RMCTD should be accurate for WES time delay, which depends on the derivatives of these same phases. The results for the various theoretical models are compared. Work partially supported by SERB (India) and the US DOE. [1] W. R. Johnson and C. D. Lin, Phys. Rev. A **20**, 964 (1979); [2] A. S. Kheifets, Phys. Rev. A **87**, 063404 (2013); [3] S. Saha *et al.*, Phys. Rev. A **90**, 053406 (2014); [4] V. Radojevic, M. Kutzner and H. P. Kelly, Phys. Rev. A **40** 727 (1989); [5] V. Radojevic and W. R. Johnson, Phys. Rev. A **31**, 2991 (1985); [6] E. P. Wigner, Phys. Rev. **98**, 145 (1955) [7] L. Eisenbud, Ph.D. thesis, Princeton University, 1948; [8] F. T. Smith, Phys. Rev. **98**, 145 (1955); [9] A. S. Kheifets *et al.*, Phys. Rev. A **94**, 013423 (2016); [10] S. B. Whitfield *et al.*, J Phys. B **40**, 3647 (2007); [11] G. Arthi *et al.*, 7<sup>th</sup> ISAMP TC7, Jan. 2018, Tirupati.

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