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Time Delay in the Photoionization of Xenon: Relativistic Effects ANKUR MANDAL, SOUMYAJIT SAHA, PRANAWA C. DESHMUKH, IIT-Madras, ASHISH KUMAR, IIT-Mandi, JOBIN JOSE, Texas A&M, STEVEN T. MANSON, Georgia State University — Owing to the advent of attosecond pulses of ioning radiation, it has been possible to measure the time delay between various photoionization channels in atoms; a number of theoretical calculations have also been performed. However, none of the extant studies have included relativistic interactions. In this study, time delay in the $5s \rightarrow \varepsilon p_{1/2}$,$\varepsilon p_{3/2}$, in $5p_{3/2} \rightarrow \varepsilon d_{5/2}$, $\varepsilon d_{3/2}$, $\varepsilon s_{1/2}$ and in $5p_{1/2} \rightarrow \varepsilon d_{3/2}$, $\varepsilon s_{1/2}$ dipole photoionization channels in Xe have been calculated within the framework of the Wigner-Eisenbud formalism [1,2] using the relativistic random phase approximation (RRPA) [3]. The RRPA includes major electron correlations which play an important role in influencing the time delay. Further, the RRPA includes relativistic effects *ab initio* and is thus especially suited for determining the time delay in spin-orbit split relativistic dipole channels. New effects, due to relativity, are found in the neighborhood of Cooper minima.

[1] E. P. Wigner, Physical Review 98, **145** (1955).
[2] L. E. Eisenbud, Ph. D. thesis, Princeton Univ. (1948).
[3] W. R. Johnson and C. D. Lin, Physical Review A **20**, 964 (1979).

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