Abstract Submitted
for the SES21 Meeting of
The American Physical Society

Finite Propagation Effects in a Laser-Dressed Quantum System[1]

MATEO CUESTA, WILLIAM BOWMAN , LUCA ARGENTI, University of Central Florida — In attosecond transient-absorption spectroscopy (ATAS), a weak extreme ultraviolet (XUV) pulse is used in combination with a moderately delayed intense infrared (IR) pulse. This combination allows for changes of the XUV spectrum to be observed as it transits through a sample of atoms or molecules. ATAS allows one to study the excitation, radiative coupling, and time-resolved evolution of the target excited states. For thin samples, the absorption spectrum coincides with that of an isolated particle. For thick samples, however, finite-propagation effects must be taken into account. Here we show how, from the non-diagonal component of the electric susceptibility of an isolated laser-dressed target quantum system, it is possible to predict the change in the XUV spectrum due to a sample of finite thickness. We illustrate this method by applying it to a laser-dressed quantum system featuring few isolated metastable states, and show how finite propagation alters the well-known profile of Autler-Townes splitting.

[1]This work was supported by the National Science Foundation through the grant No. 1912507.

Mateo Cuesta
University of Central Florida

Date submitted: 30 Sep 2021

Electronic form version 1.4