# Analysis of the Classical Trajectory Treatment of Photon Dynamics for Polaritonic Phenomena

Bart Rosenzweig
*Department of Mathematics and Statistics, Hunter College of the City University of New York,*
*695 Park Avenue, New York, New York 10065, USA*[*]

Norah M. Hoffmann
*Department of Chemistry, Columbia University, New York, New York 10027 USA*

Lionel Lacombe and Neepa T. Maitra
*Department of Physics, Rutgers University, Newark 07102, New Jersey USA*[†]
(Dated: November 19, 2021)

[*] Current Address: Department of Mathematics, The Ohio State University, 231 W 18th Avenue, Columbus, OH 43210
[†] Current address:Laboratoire des Solides Irradiés, École Polytechnique, Institut Polytechnique de Paris, F-91128 Palaiseau, France

# I. MOVIES

We provide two movies:

1. **MTE.mp4** shows the dynamics of the photonic displacement coordinate density computed via MTE (orange) compared to the exact quantum solution (blue) for reference. This movie corresponds to the results given in Fig.3 in the paper.

2. **4-panel.mp4** shows the dynamics of the photonic displacement coordinate density computed via the quasi-classical (orange) and quantum on the wBO surface (green) along with the exact quantum (black) for reference (top right panel). The top left panel shows the dynamics of the photonic displacement coordinate density computed via the quasi-classical (orange) on the full qTDPES compared to the exact quantum (black) for reference. The bottom left panel shows the dynamics of the exact qTDPES. The bottom right panel shows the dynamics of the wBO. This movie corresponds to the results given in Fig.3 in the paper. This movie corresponds to the results given in Fig.3 in the paper.