

PHYS 6208 1.0: Topics in Atom/Molecule-Laser Interactions (Fall 2020)

Course Director: Tom Kirchner, PSE 228, ext. 33695, tomk@yorku.ca
WWW: www.yorku.ca/tomk/phys6208.html
Class Times: tbd
Office Hours: tdb
Text: **F. Grossmann**, *Theoretical Femtosecond Physics*, Springer 2018
(H. Friedrich, *Theoretical Atomic Physics*, Springer 2017)
further references will be provided in class

A combination of synchronous and asynchronous instruction will be used in this course, i.e., some of the material will be delivered in the form of pre-recorded lectures (plus pdf versions of my notes), but we will also meet (via Zoom) to discuss and augment the material. More specifics will be announced at the end of September. The course will begin **after Reading Week**.

Content

”Discussion of one or more topics in laser-matter interactions. Specific topics will vary.”

Topics:¹

- 1 Time-dependent (semiclassical) treatment of light-matter interactions
 - Length and velocity gauges, Kramers-Henneberger transformation, Volkov states
 - Two-level systems (Rabi oscillations, rotating-wave approximation)
 - Floquet theory, Strong-field approximation, ...
- 2 Phenomena
 - Tunnel, multi-photon, and above-threshold ionization; stabilization, recollision physics, high-harmonic generation, femtosecond spectroscopy, ...

Marking scheme

- One assignment (at the end of the minicourse): 100 % of final grade

¹Some optional