

# PHYS 518 A Wi 20: Quantum Mechanics

[Jump to Today](#)



Prof. [Steve Sharpe](http://faculty.washington.edu/srsharpe/) (<http://faculty.washington.edu/srsharpe/>) ([srsharpe@uw.edu](mailto:srsharpe@uw.edu))  
(<mailto:srsharpe@uw.edu>)

MWF 9:30-10:50 PAB: A114

Office hours: Tuesdays 1-2pm in PAB B406 (and possibly other times TBD)

TA: Hao Geng ([hg666@uw.edu](mailto:hg666@uw.edu)) (<mailto:hg666@uw.edu>) and Huangyu Xiao ([huangyu@uw.edu](mailto:huangyu@uw.edu))  
(<mailto:huangyu@uw.edu>)

TA Office hours: Tuesdays 3-5pm, with Hao in B155

Welcome to PHYS 518 (Winter 2020)! This is the second quarter of the year-long graduate QM sequence. For information about texts, homeworks, exams and grading see [Course Information Phys 518](#) (which is also on the "Pages" link). HWs will be due on Wednesdays, starting in the second week. There will be no lectures on the holidays on Jan 20. and Feb. 17, and, in addition, no lecture on Feb. 14. As "training" for the final exam (which counts towards the MRE) there will be two midterms, on Fridays Feb. 7th and March 6th. The final exam is on Tuesday, March 17th, 10:30-12:20, in A114.

My aim this quarter is to cover Sakurai & Napolitano (SN) Chapters 3-5, with additional material included as needed. The general topics that I aim to cover are listed below. Note that I will not follow SN's development or order precisely.

- Density matrices; mixed versus pure ensembles.
- Rotations, and the groups  $SO(3)$  and  $SU(2)$ .
- Angular momentum in QM, including addition of angular momenta.
- Tensor operators and the Wigner-Eckart theorem.
- 3-d Schrodinger equation and application to the hydrogen atom, including Runge-Lenz vector.
- Discrete symmetries: parity (recap from 517) and time-reversal.
- Time-independent perturbation theory and applications to hydrogen-like atoms
- Time-dependent perturbation theory and applications including Fermi's Golden rule
- Adiabatic approximation and Berry phases.

The detailed lecture-by-lecture coverage will emerge as the quarter progresses. I plan to post detailed lecture notes before each lecture; these can be accessed from the daily links below.

Code of Conduct (excerpted from [Physics Department Code of Conduct](#) (<https://phys.washington.edu/code-conduct-uw-department-physics>))

"Creating a supportive environment to foster academic and scientific progress and ensuring that all members of the department have access to a safe working and learning environment is a collective responsibility. Should unprofessional or inappropriate actions or comments be observed or experienced, direct intervention calling attention to the problematic behavior is often the best response. If that does not feel appropriate or safe, one should contact Physics Student Services, one's supervisor, the Physics Ombud, and/or [SafeCampus](https://www.washington.edu/safecampus/) (<https://www.washington.edu/safecampus/>) to help determine and effect an appropriate response."

As appropriate, please feel free to bring up issues with me, either in person, by email, or via an [anonymous comment](#). (<https://catalyst.uw.edu/webq/survey/srsharpe/377978>)