**Syllabus**

**Spectroscopy and Radiative Transfer of Planetary Atmospheres**

**Earth and Planetary Sciences 238, Spring 2014**

|  |  |
| --- | --- |
| January 28 | Introduction - Atmospheric measurement programs |
| January 30 | Basic Earth and atmospheric properties |
| February 4 | Solar properties |
| February 6 | Background information (elements of math and physics) |
| February 11 | Blackbody radiation, Boltzmann statistics, temperature and equilibrium;  *1st project assignment* |
| February 13 | Radiative transfer |
| February 18 | Spectroscopy: Introduction and molecular rotation |
| February 20 | Vibrational spectroscopy |
| February 25 | *1st project due: Presentations and discussion* |
| February 27 | Spectroscopy: Line shapes |
| March 4 | Spectroscopic data bases (Dr. Laurence Rothman on HITRAN) |
| March 6 | Electronic spectroscopy |
| March 11 | Atmospheric scattering |
| March 13 | Radiation and climate |
| March 15-March 23 | Spring Recess |
| March 25 | Atmospheres and instruments |
| March 27 | Radiative transfer modeling; *2nd project assignment* |
| April 1 | Aerosols |
| April 3 | Aerosols |
| April 8 | Atmospheric retrieval methods |
| April 10 | Applications to atmospheric measurements |
| April 15 | Applications to atmospheric measurements |
| April 17 | *2nd project due: Presentations and discussion* |
| April 22 | Applications to atmospheric measurements |
| April 24 | Applications to atmospheric measurements; *Final project assignment* |
| April 29 | Applications to atmospheric measurements |
| May 1-May 8 | Reading Period *Final project presentations and discussion* |

Fortran tutorial (CM?)

Presentations (5 days)

Chris Miller: Satellite data

Gonzalo Gonzalez Abad: Fitting and applications to OMI

Atmospheric applications: Earth (Dr. Caroline Nowlan); Mars (Dr. Huiqun Wang)

Peter Zoogman: Physics studies for TEMPO

Xiong Liu: Ozone profile and tropospheric ozone retrievals from satellite UV measurements