



THE OHIO STATE UNIVERSITY



Ohio Supercomputer Center

An OH·TECH Consortium Member



Research based course on Atomic Astrophysics and Spectroscopy with computational workshops on SUPERSTRUCTURE By Prof. Sultana N. Nahar (Email: nahar.1@osu.edu)

- Lectures & Workshops: 3 hours/session, Sep 13 - Sep 25, 2022
- Venue: Physics Dept, Time: 10 am - 1 pm, India time
- Computational Facility (online): Ohio Supercomputer Center (OSC), USA

Course certificates (completion/participation w/o exam) will be provided

- Textbook: "Atomic Astrophysics and Spectroscopy" -By A.K. Pradhan and S.N. Nahar (Cambridge University Press, 2011)
- Contacts: Physics Department Office or Prof. Tauheed Ahmad (Email: ahmad-tauheed@rediffmail.com, Mobile: 91-8279632366, 9837404077)

SYLLABUS

Week 1 (Sep 13, 17, 2022): Plasma, Atomic Structure, Computational Workshop

- i) Light and Matter, Universe, Plasma Sources, Particle and Photon Distributions
- ii) Atomic Structure: Hydrogenic & Non-Hydrogenic Spectra
- iii) Hartree-Fock, Dirac, Breit-Pauli Approximations
- iv) Computational Workshop: SUPERSTRUCTURE

Week 2 (Sep 24, 25): Radiative & Collision processes, Computational Workshop

- i) Atomic Process in Plasmas - Radiative Transitions, Electron-Impact Excitation,
- ii) Photoionization, Electron-Ion Recombination, Opacity
- iv) Close-Coupling Approximation and R-matrix Method
- iii) Computational Workshop: SUPERSTRUCTURE
- ii) Exam, Evaluation Certificate