

## Research based course: **ATOMIC ASTROPHYSICS WITH COMPUTATIONAL WORKSHOPS:**

- Prof. Sultana N. Nahar, Astronomy, The Ohio State University, USA

- 4 sessions - 2 for lectures and 2 for computationation workshops, Oct 30-31, 2017

- Textbook: "Atomic Astrophysics and Spectroscopy"

-By A.K. Pradhan and S.N. Nahar (Cambridge University Press, 2011)

- Computational Facility: Ohio Supercomputer Center (OSC), USA

- Venue: Dept of Physics, University of Rajshahi, Time: TBA

### SYLLABUS

Session 1 (Oct 30, 2017): Plasma, Atomic Structure, Atomic processes

i) Light and Matter, Plasma Sources

ii) Atomic Structure: Hydrogenic & Non-Hydrogenic Spectra

iii) Hartee-Fock, Dirac, Breit-Pauli Approximations

iv) Atomic Process in Plasmas - Radiative Transitions, Electron-Impact Excitation,

Session 2 (Oct 30): Computational Workshop

i) Program: SUPERSTRUCTURE

Session 3 (Oct 31): Radiative & Collision processes, Computational Workshop

i) Photoionization, Electron-Ion Recombination, Opacity

ii) Close-Coupling Approximation and R-matrix Method

iii) Computational Workshop: R-matrix

Session 4 (October 31): Computational Workshop, Exam, Certificate

ii) Computational Workshop: R-matrix

iii) Review, Exam, Evaluation

Ceremony and Seminar (Nov 1): Seminar, Certificate distribution Seminar:

"Atomic astrophysics of stellar spectroscopy: Exoplanetary host stars"