

Condensed course: "Astrophysical Atomic Processes, Opacity, & Cancer Treatment with X-rays" & Computational workshops with R-matrix Codes & SUPERSTRUCTURE

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

- Under the MOA between Ohio State University & Cairo University
- 3 Weeks Lecture Course: 3 days (Sun,Tues,Thurs)/week, Oct 22 - Nov 10, 2016
- 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, Cairo University, Time: TBA

SYLLABUS

Week 1 (Oct 23 - 28, 2016): Plasma, Atomic Structure, Computational Workshop

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

Week 2 (Oct 30-Nov 2): Radiative & Collision processes, Computational Workshop

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

Week 3 (Nov 4 - 9): X-rays, Computational Workshop, Exam, Certificate

- i) Cancer treatment with x-rays, ii) Computational Workshop: R-matrix
- iii) Review, Exam, Evaluation
- iv) Future Directions and Certificate ceremony