

"ATOMIC AND MOLECULAR RADIATION PHYSICS: ASTRONOMY TO BIOMEDICINE"

Prof Anil K. Pradhan & Prof Sultana N. Nahar

Astronomy, Ohio State University, Columbus, Ohio, USA

Under IndoUS Program

- 4 Weeks Lecture Course, February 10 - March 8, 2014

- Textbook: "Atomic Astrophysics and Spectroscopy"

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

- Time: 3:00 -5:00 p.m. (DU: MTW, AMU: ThFSa)

- Venue:

D.U. Lecture Hall No. 71, Department of Physics & Astrophysics,
AMU: Conference room, Department of Physics

SYLLABUS

Week 1 (Feb 10-12, 13-15):AMO Physics and the Universe

i) Light and Matter

ii) Plasma Sources

iii) Particle and Photon Distributions

iv) Atomic Structure: Hydrogenic & Non-Hydrogenic Spectra

Week 2 (Feb 17-19,20-22):Theory & Computational Workshop

i) Hartee-Fock Approximation, Dirac Equation,
Breit-Pauli Approximation

ii) Radiative Transitions

Workshop: Computation with SUPERSTRUCTURE

iii) Excitations and Ionization

Week 3 (Feb 24-26, 27-Mar 1):Atomic Processes

i) Close-Coupling Approximation and R-matrix Method

ii) Workshop: R-matrix Calculations

iii) Photoionization and Electron Ion Recombination

Week 4 (Mar 3-5, 6-11): Applications, Ceremony

i) Molecular Physics

ii) Biophysics and Exam

iii) Future Directions and Certificate ceremony