

NASA/GODDARD SPACE FLIGHT CENTER SCIENTIFIC COLLOQUIUM

SPEAKER: SULTANA NAHAR
OHIO STATE UNIVERSITY

**SUBJECT: KNOWING THE UNIVERSE THROUGH
ATOMS**

DATE: WEDNESDAY, DEC. 13, 2017, 3:30 P.M.*

PLACE: BUILDING 36, ROOM C211
PLEASE NOTE CHANGE OF LOCATION



We study the universe through the radiation of photons from astronomical objects reaching us. These photons are emitted by atoms and molecules, mostly atoms, either in the plasma of an astronomical object or traveling in the space in-between them. Due to quantum energy levels the emitted photons are of particular wavelengths, which are the signatures to identify the atoms. They also determine the space observation either by ground-based telescopes or space-based observatories. Photometry and imaging give size, location, distance and limited information on plasma contents of an astronomical object; spectroscopy gives the maximum information. The spectrum includes both the emission and the absorption lines which provide information on the physical conditions of plasma density and temperature, chemical composition and their abundances, even presence of a black hole. It is important to understand the underlying science of the radiation, how they are produced by the atoms and the types, and harness the knowledge for our benefits such as understanding the sun, events on the earth and space; even for applications in medicine.

About the speaker:

Sultana Nahar received a Ph.D. in atomic theory from Wayne State University. She is the recipient of the Distinguished Alumni award. Her research interests include: Atomic astrophysics - photoionization, electron-ion recombination, radiative transitions and lifetimes, and collisional excitations. She is a member of the international Opacity Project and the Iron Project to study atomic processes, calculate large sets of atomic parameters with high accuracy, and develop astrophysical applications. She is called the "Iron Lady" for her extensive work on iron. A.K. Pradhan, Y. Yan and Nahar introduced "Resonant nano-plasma for Theranostics" for cancer treatment. Her publications include over 150 scientific papers and 15 news articles on international STEM education and research. She maintains the database NORAD-Atomic-Data for energies, oscillator strengths and lifetimes, photoionization cross sections, and recombination rates. She is an APS fellow, was named APS Woman Physicist of the Month, and received the John Wheatley Award of APS. She is the co-author of the textbook *Atomic Astrophysics and Spectroscopy* (Cambridge U press). She has STEM education and research programs in Bangladesh, Egypt, India, Palestine, and the USA.

Scientific Colloquium Committee Sponsor: Anand Bhatia – Code 671 – (301) 286-8812

Dec. 20, 27
Jan. 3, 2018

No Colloquia

Jan. 10

Matthew McHarg, Air Force Academy

BUILDING 3 AUD.

High Speed Imaging and Spectra of Streamers and Leaders

Coffee and tea served at 3:00

*For up to date Colloquium information, visit <http://scicolloq.gsfc.nasa.gov>