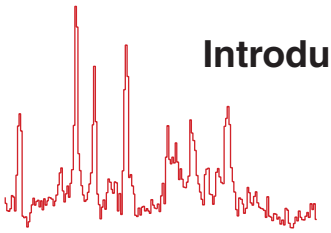

Introduction to the Analysis of Astrophysical Spectra

May 27 – June 6, 2003
Lawrence Livermore National Laboratory

A two-week summer school will be held at the University of California Lawrence Livermore National Laboratory from May 27 through June 6, 2003. The summer school will expose the students to astrophysical observations, atomic physics, data analysis, experimental techniques, and to facilities for laboratory astrophysics.

Nine half days of lectures will introduce the students to the physics of astrophysical spectra, including the underlying atomic physics needed for their analysis. Daily seminars by LLNL scientists active in NASA-funded projects will provide insight into cutting-edge research in observational and computational aspects of astrophysics. The students will also participate in ongoing research activities that use the LLNL Electron Beam Ion Trap Laboratory Astrophysics Facility to produce and measure spectra. They will tour other relevant research facilities at LLNL, and learn about experimental and engineering aspects of space science.

The summer school is designed for highly motivated advanced undergraduate and beginning graduate students. Enrollment will be strictly limited in order to maximize individual interaction with LLNL scientists and other participants. Up to eight, students are expected from several institutions supported by grants from the NASA Minority University Education and Research Partnership Initiative in Space Science, DOE Atomic, Molecular, and Chemical Sciences, or the LLNL Research Collaborations Program for HBCUs & MIs. These include Florida A& M University, Alabama A& M University, Morehouse College, and South Carolina State University.

Outline of the school topics:

Introduction to the spectra from heliumlike ions in the Sun and Astrophysical Objects
Atomic structure heliumlike ions
Radiative transitions
Electron-impact excitation
Determination of plasma density from the line emission
Dielectronic recombination
Determination of electron temperature from the line emission
Line shapes of astrophysical lines
Determination of plasma velocity
Determination of the ion temperature
Ionization equilibrium
Lines from neighboring charge states
Line emission from plasmas out of ionization equilibrium (Supernova Remnants, Flares)
Charge exchange processes in the solar system and deep space (Comets, Planetary Atmospheres, Stellar winds)
Spectra from photoionized nebulae
Photoionization