NASA/CR-97 - 206061

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Final Progress Report: ADP 110-94, NAS5-32643

(8/18/94 - 9/17/97)

A Comprehensive Opacities/Atomic Database for the Analysis of Astrophysical Spectra and Modeling

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The main goals of this ADP award have been accomplished. The electronic database TOPBASE, consisting of the large volume of atomic data from the Opacity Project (Seaton, Yu, Mihalas, and Pradhan 1994, MNRAS, 266, 805), has been installed and is operative at a NASA site at the Laboratory for High Energy Astrophysics Science Research Center (HEASRC) at the Goddard Space Flight Center. The database will be continually maintained and updated bu the PI and collaborators. TOPBASE is publicly accessible from *IP: topbase.gsfc.nasa.gov.*

During the last six months (since the previous progress report), considerable work has been carried out to (i) put in the new data for low ionization stages of iron: Fe I - V, beginning with Fe II, (ii) High-energy photoionization cross sections computed by Dr. Hong Lin Zhang (consultant on the Project) were 'merged' with the current Opacity Project data and input into TOPbase, (iii) plans laid out for a further extension of TOPbase to include TIPbase, the database for *collisional data* to complement the radiative data in TOPbase.

Publications: The primary aim of this project is the establishment of a comprehensive electronic atomic data base for astrophysicists. Nearly all the atomic calculations are supported by other sources. However, partial ADP grant support has been acknowledged in several publications. Listed below are the publications from this period. We also expect the users of the database to acknowledge the TOPBASE installations at GSFC and OSU.

1. "Atomic data from the Iron Project. XVII. Radiative transition probabilities for dipole allowed and forbidden transitions in Fe III", Astron.Astrophys. (in press), Sultana N. Nahar and Anil K. Pradhan.

2. "Photoionization Cross Sections And Oscillator Strengths For Fe III", Phys.Rev.A 53, 1545 (1996), Sultana N. Nahar.

3. "Atomic data from the Iron Project. XVII. Radiative transition probabilities for dipole allowed and forbidden transitions in Fe III", Astron.Astrophys.Suppl.Ser., 119, 509 (1996), Sultana N. Nahar and Anil K. Pradhan.

4. "The Opacity Project and the Iron Project", Anil K. Pradhan, in *Astrophysics in the Extreme Ultraviolet*, Ed: S. Bowyer and R.F. Malina, Kluwer Academic Publishers, 569-576 (1996).