

# **INFLUENCE OF CORONAL ABUNDANCE VARIATIONS**

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**Final Report**

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During the final year of this program we concentrated on understanding the how to constrain the models with the best available observations. Work on developing accurate temperature and density diagnostics from TRACE and CDS together with constrained fits of non-potential force free fields will be extremely useful in the guiding the next generation of coronal models.

The program has produced three fully operation numerical codes that model multi-species of ions in coronal loops: Static models and constant flow models. The time dependent numerical models have not been completed.

We have extended the steady flow investigations to study the effect these flows have on coronal structure as observed with TRACE. Coronal observations derive from heavy-ion emission; thus, we focus on the extent to which flow may modify coronal abundances by examining the heavy-ion abundance stratification within long-lived loops. We discuss the magnitudes of the physical effects modeled and compare simulated results with TRACE observations. These results can have a profound effect on the interpretation of TRACE observations.

#### Papers/talks

"Flows in long-lived multi-species coronal loops," presented at

Coronal Loops Workshop, 13-15 Nov 2002, Orsay, France "Effects of Large-Scale Flows on Coronal Abundances:

Multi-species Models and TRACE Observations", 2003, SPD Meeting #34 "Effects of Flow on Structure and Abundances in Multi-species

Solar Coronal Loops", 2004, ApJ, 604, 433 "Modeling Magnetic Flux Ropes in the Solar Atmosphere", Proceeding of CHALLENGES TO MODELING THE SUN-EARTH SYSTEM workshop Huntsville, Al Oct 2004 in press.