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THE KURUCZ (SMITHSONIAN) ATOMIC AND MOLECULAR DATABASE

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I am attempting to provide all of the basic atomic and diatomic molecular data needed to compute opacities, model atmospheres, and spectra. For opacity and model atmosphere calculations where only statistical accuracy is needed, the current list of 58 million lines, most with predicted wavelengths, works reasonably well. However, when computing spectra using only lines with good wavelengths, the quality is very poor. One half of the lines are missing. Most of the gf values need to be corrected. Even the laboratory wavelengths are not always reliable. In addition, it now appears that hyperfine and isotopic splitting must be included because the quality of spectra is now high enough to show such effects.

All my old data are available on CD-ROMs. I have now begun to recompute everything using the latest laboratory analyses. Next I will extend the calculations to all elements and to all significant diatomic molecules that now are missing from my list. I will also add as much hyperfine and isotopic data as possible. These new calculations will be distributed on CD-ROMs as they are produced.

Second Session: Stellar Atmospheres (Tuesday August 23, morning)

OPACITY INCOMPLETENESS AND ATMOSPHERES OF COOL STARS

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The completeness of opacity data for model photospheres of late-type stars is discussed. It is concluded that for the Sun there are still indications that the uv opacity is not quite satisfactorily described by existing data; a problem that seems still more pronounced for K giants. For M, N and S stars the situation is improving rapidly but still far from satisfactory due to incomplete data for a number of molecules. The significance of these shortcomings is discussed in view of other, perhaps more fundamental, problems in the modelling of late-type stellar atmospheres.