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Measurements of high-temperature optical constants of solar-nebula minerals

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In this project, we measure the wavelength-dependent high-temperature optical constants of solar-nebula minerals in the infrared wavelength range [1] for use in models of the solar nebula, of protoplanetary disks, and possibly of stellar atmospheres.

In the coming period we will investigate originally amorphous materials (glasses) exposed to high temperatures. We will study the mid-infrared spectra of these materials in-situ (using a high-T cell inserted into the FTIR spectrometer) and ex-situ at higher temperatures than reachable with this cell. We will focus on magnesium-iron silicates similar to cosmic dust that is incorporated into the solar nebula and processed during the formation of the solar system.

We expect to obtain new results on the structural changes within such iron-containing silicates during annealing and to deliver infrared spectra of such materials which can be used in the interpretation and modelling of astronomical spectra of protoplanetary accretion disks similar to the solar nebula.

+ [1] Zeidler, S. et al. (2013) Astron. Astrophys. 553, A81. +

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