

**HELIOS-K: The challenge of calculating opacity functions for  $10^{10}$  molecular lines.**

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The ExoMol database provides line lists with a very large number of transitions. For some molecules, more than  $10^{10}$  transitions are provided. Using these line lists for exoplanetary atmospheric characterization, involves the processing of opacity functions for multiple points in temperature and pressure as well as many points in wavelength for all molecular transition lines. This set a hard computational challenge. We will present our work on the GPU opacity calculator HELIOS-K and describe how we use it to process the ExoMol line lists.

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