# What you need to know to use the ExoMol Line Lists.

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**Abstract**

ExoMol has made a name in producing high quality, complete high-temperature line lists for a wide variety of astrophysically relevant molecules, including biomarkers. These line lists (specifying the frequency and intensity of absorption lines in molecules) are used in complex atmospheric models to predict absorption based on temperature, pressure, atmospheric composition and other factors. But what if your observed spectrum doesn't match your model? Have you used the wrong input parameters? Is the atmospheric model wrong? Or is the underlying line list wrong?

As a producer of line lists in the ExoMol group, I can help you answer the last question. I will tell you how we produce these line lists and, most importantly, where we expect errors to occur and where they will not occur (as well as tell you about what sort of errors and their magnitude). For example, if you are looking at water absorption around 3000 cm-1, then the line lists will be near perfect. Looking at VO at 17,000 cm-1 (in the visible) - not so much. Why? I will tell you what molecules, parameters and spectral regions are easy for us to study, and which are difficult, and why this is the case. I will explain where experimental data is critical, the accuracy with which different input parameters can be calculated by ab initio theory, and how experiment and theory can be used together to build a more complete picture of the spectroscopy of molecules.

And, if nothing else, you should come to my talk to hear why the ExoMol group talks (and thinks) in cm-1.

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