

The spectrum of sodium hydride and its detection in the atmospheres of cool red dwarfs

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In the paper “ExoMol molecular line lists – X. The spectrum of sodium hydride”² published in 2015, we provided rotational, rotational-vibrational, and rotational-vibrational-electronic line lists for sodium hydride in its ground and excited electronic states, and for the two isotopes NaH and NaD. This was achieved by using potential energy curves from literature sources³ obtained using spectroscopic data, and with *ab initio* dipole moment curves. The PECs and DMCs were used as inputs for the diatomic code LEVEL,⁴ which then produced the energy levels of the molecules and the intensities of the transitions.

In 2018, a group from the Australian National University in Canberra combined this line list with astronomical observations to claim that NaH is present in the atmospheres of two well-known red dwarfs: Proxima Centauri and Wolf 359.

In this poster I will discuss the methods used to produce the NaH line lists, and the brief history of the detection of NaH in astrophysical objects.

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