Potential energy and dipole moment surfaces of $\text{H}_3^-$ molecule\textsuperscript{1}
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Laboratoire Aimé Cotton, CNRS, Université de Paris Sud, Orsay, France, VIATCHESLAV KOKOULINE\textsuperscript{2}, Department of Physics, University of Central Florida, Orlando, Florida 32816 — A new potential energy surface for the electronic ground state of the simplest triatomic anion $\text{H}_3^-$ is determined for a large number of geometries. Its accuracy is improved at both short and large distances compared to previous studies. The permanent dipole moment surface of this state is also computed for the first time. Nine vibrational levels of $\text{H}_3^-$ and fourteen levels of $\text{D}_3^-$ are obtained, bound by at most $\sim 70\text{cm}^{-1}$ and $\sim 126\text{cm}^{-1}$ respectively. These results should guide the spectroscopic search of the $\text{H}_3^-$ ion in cold gases (below 100K) of molecular hydrogen in the presence of $\text{H}^-$ ions.

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