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Electronic excitation of furfural as probed by high-resolution vacuum ultraviolet spectroscopy, electron energy loss spectroscopy, and *ab initio* calculations

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ABSTRACT

The electronic spectroscopy of isolated furfural (2-furaldehyde) in the gas phase has been investigated using high-resolution photoabsorption spectroscopy in the 3.5–10.8 eV energy-range, with absolute cross section measurements derived. Electron energy loss spectra are also measured over a range of kinematical conditions. Those energy loss spectra are used to derive differential cross sections and in turn generalised oscillator strengths. These experiments are supported by *ab initio* calculations in order to assign the excited states of the neutral molecule. The good agreement between the theoretical results and the measurements allows us to provide the first quantitative assignment of the electronic state spectroscopy of furfural over an extended energy range.

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