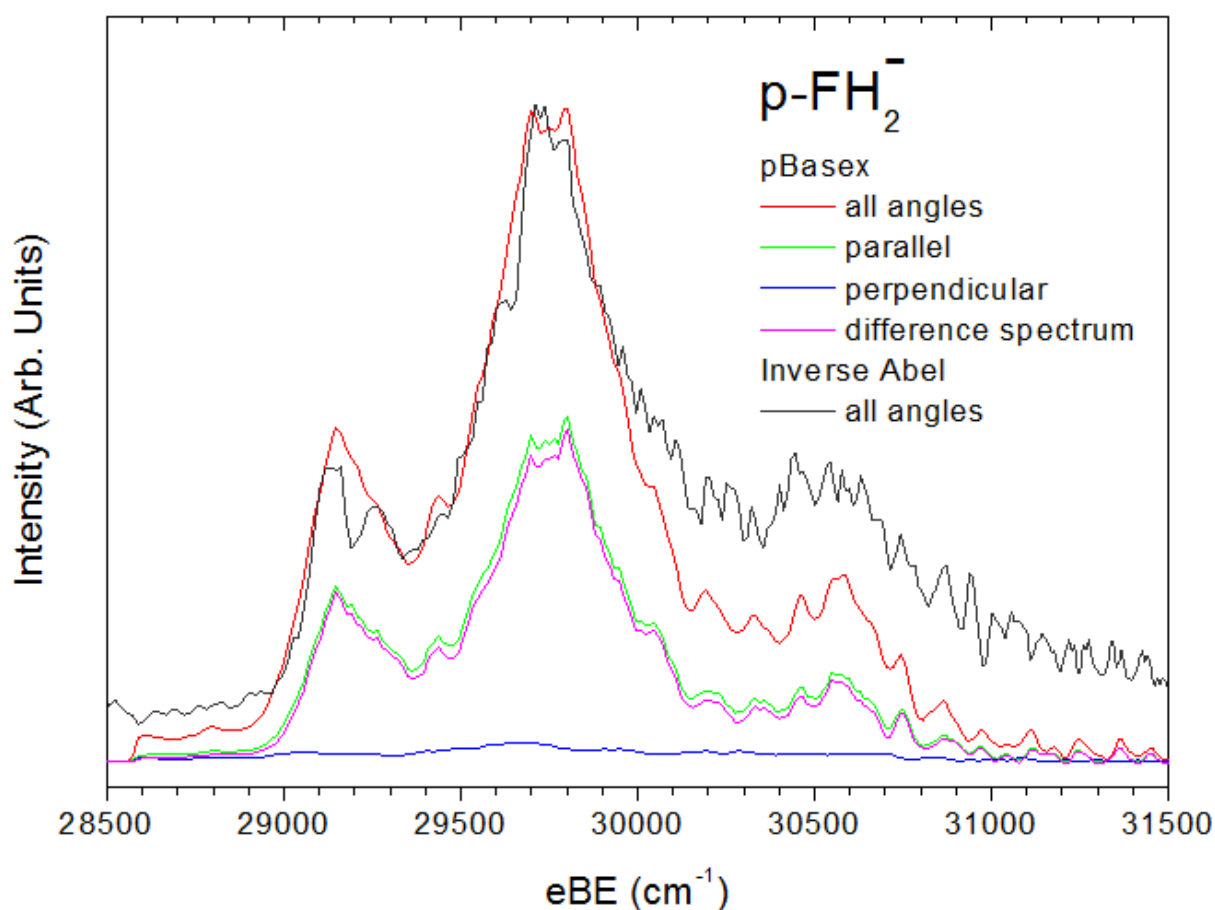


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**ELECTRONIC  
SUPPLEMENTARY MATERIAL****Vibrationally Resolved Transition State Spectroscopy of the F+H<sub>2</sub> and  
F+CH<sub>4</sub> Reactions**Tara I. Yacovitch<sup>a</sup>, Etienne Garand<sup>a,c</sup>, Jongjin B. Kim<sup>a</sup>, Christian Hock<sup>a</sup>, Thomas Theis<sup>a</sup> and Daniel M. Neumark<sup>\*,a,b</sup>

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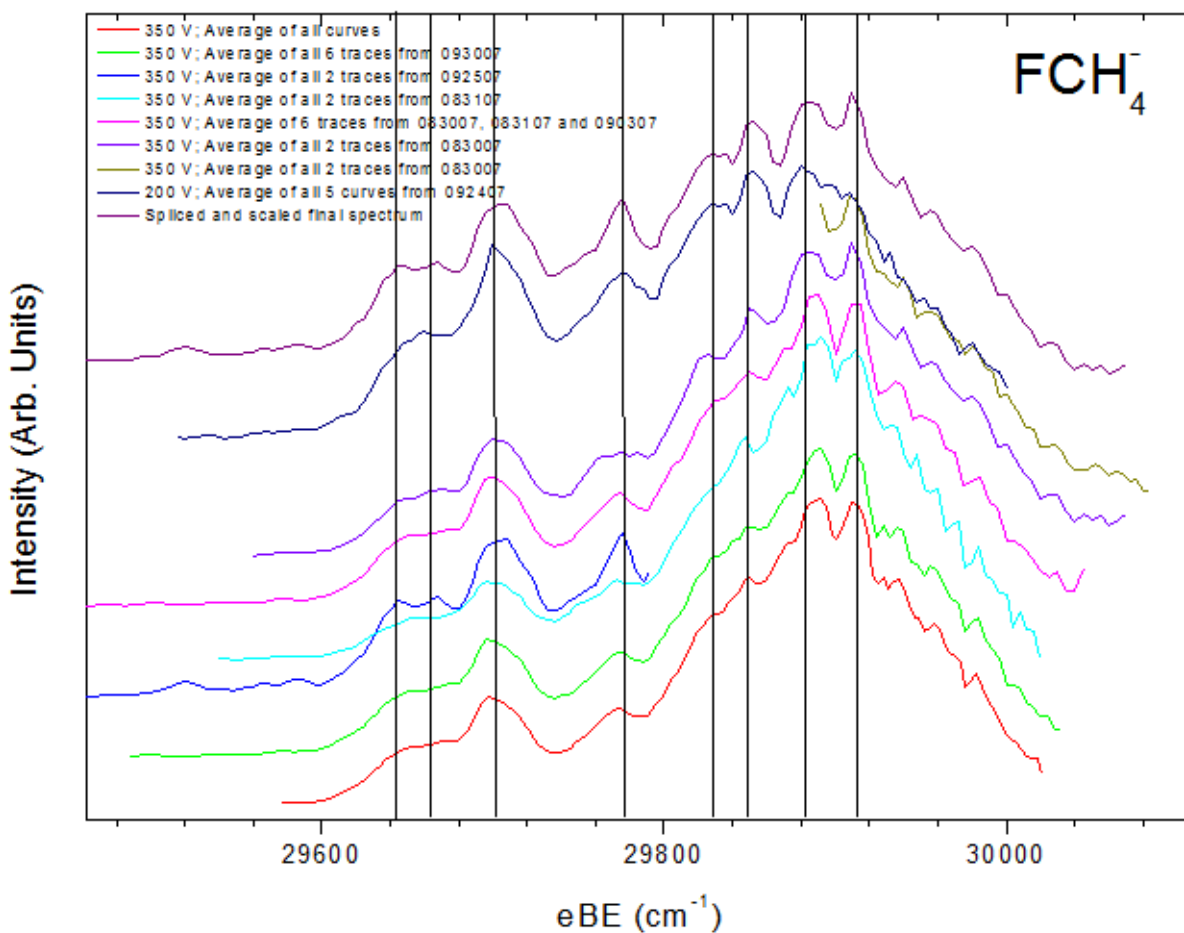
**Fig. ES11** Spectra involved in the work up of a sample  $p\text{-FH}_2^-$  spectrum taken with a laser energy of 311 nm. Red and black curves compare the total integrated spectrum for the inverse Abel and pBasex methods of image transformation, respectively. Green and blue traces compare the integrated signal in 45° slices parallel and perpendicular to the laser polarization axis, respectively. The perpendicular spectrum should correspond to pure  $s$ -wave signal, while the parallel spectrum should correspond to a sum of  $p$ -wave and  $s$ -wave results. The magenta trace shows the parallel – perpendicular difference spectrum corresponding ideally to pure  $p$ -wave results.



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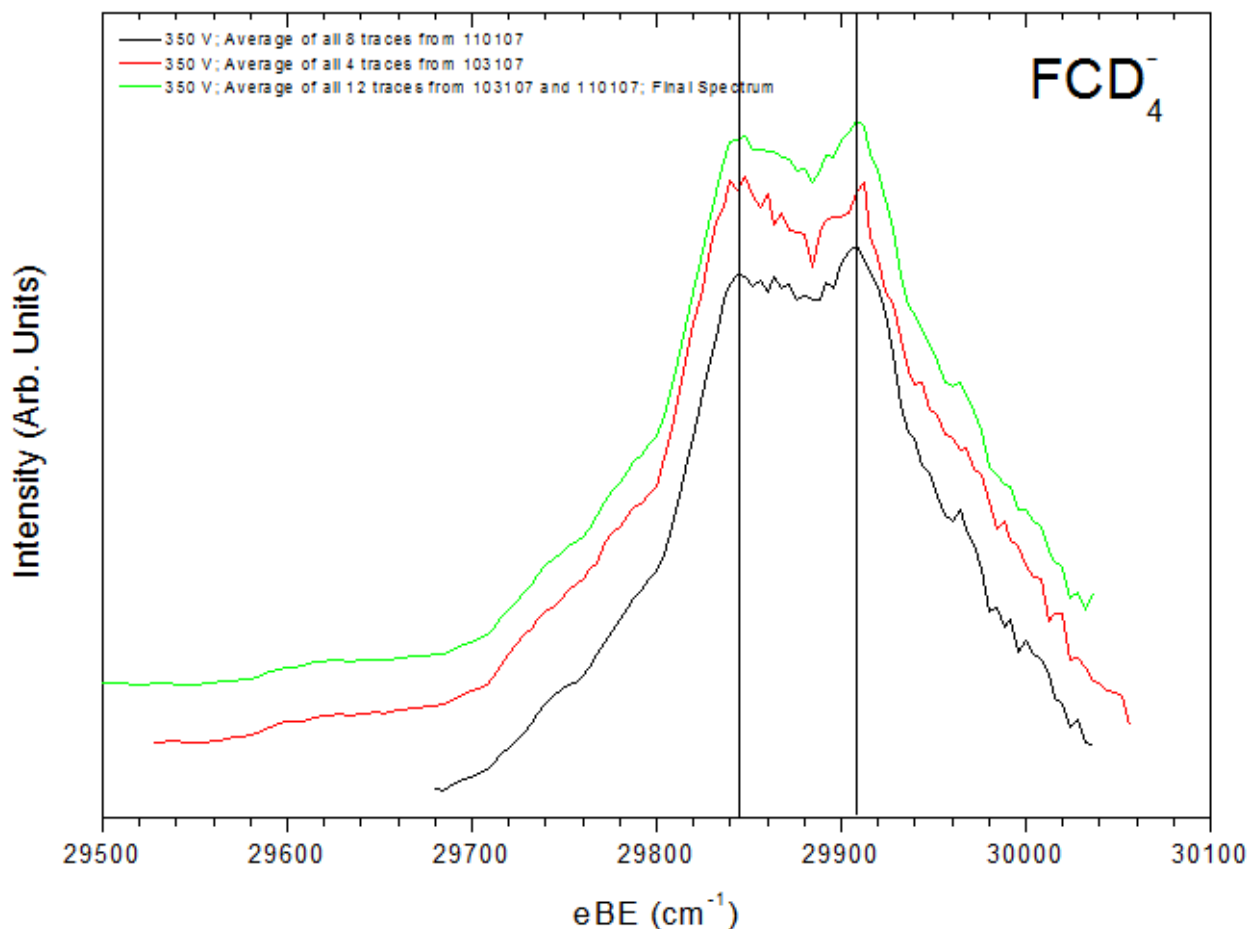
**Fig. ES12**  $\text{FCH}_4^-$  averaged spectra taken with a VMI voltage of -350 V or -200 V. Averages of all available data are shown alongside averages of selected data sets. The spliced and scaled final spectrum is also shown for comparison. The labels 093007, 092507, etc. refer to groups of data taken on the same day. Vertical lines show the constant peak positions of the fine structure despite variations in intensity and resolution.



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**Fig. ES13**  $\text{FCD}_4^-$  averaged spectra taken with a VMI voltage of -350 V or -200 V. Averages of all available data are shown alongside averages of selected data sets. The spliced and scaled final spectrum is also shown for comparison. The labels 110107 and 103107, etc. refer to groups of data taken on the same day. Vertical lines show the constant peak positions of the fine structure despite variations in intensity and resolution.

### 5 Notes and references

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