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### Author contributions

C.H. built the VMIS. F.B., D.D. and S.P. operated the laser system. A.F., E.M., V.B. and Y.M. built the high-harmonic beamline. A.F., M.D., A.C., R.G., L.M., D.S., S.W., T.R., V.B. and Y.M. carried out the measurements. A.F. and Y.M. analysed the optical polarimetry measurements. G.A.G. and L.N. inverted the VMIS images and extracted and rationalized the PECD data. B.P. performed the theoretical calculations. Y.M. designed the manuscript. All authors contributed to the interpretation of the data and writing of the manuscript.

### Additional information

Supplementary information is available in the [online version](#) of the paper. Reprints and permissions information is available online at [www.nature.com/reprints](http://www.nature.com/reprints). Correspondence and requests for materials should be addressed to Y.M.

### Competing financial interests

The authors declare no competing financial interests.