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Detection of OH in the ultra-hot Jupiter WASP-76b

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Ultra-hot Jupiters have dayside temperatures at which most molecules are thermally dissociated. The dissociation of water vapour results in the production of the hydroxyl radical (OH). We report on the detection of OH in the atmosphere of the ultra-hot Jupiter WASP-76b using high-resolution transmission spectroscopy with CARMENES. Our detection shows that water is indeed being thermally dissociated on the limbs of this planet, and may thus explain the relatively weak water features observed for similar ultra-hot Jupiters. The observed signal is blueshifted with -13 km/s and we find a somewhat puzzling offset in the derived orbital velocity. Both may be explained by a limb asymmetry and the presence of strong winds in the upper atmosphere of WASP-76b.

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