

# First Measurement of $W$ Helicity Fractions at LHCb

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The measurement of the  $W$  helicity states provides a fundamental probe at understanding the production mechanisms of  $W$  bosons at the LHC.  $W$  boson helicity states have shown a strong dependency on  $|y_W|$ , with increasingly left-handed states expected with forward production. The LHCb detector provides a unique kinematic coverage, with lepton acceptance of  $2 < \eta < 5$ , in which an unparalleled measurement of  $W$  helicity states can be measured. Using the 2D distribution of lepton kinematics,  $p_T^\ell$  and  $\eta^\ell$ , a template fit can be made to extract the helicity fractions as a function of  $y_W$  without needing to reconstruct the  $W$  boson kinematics directly.

[zoom]

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