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Measurement of the Invisible Width of the Z Boson with the ATLAS Detector

A measurement of the partial decay width of the Z boson into invisible particles with the ATLAS detector at the LHC is presented, using an integrated luminosity of 37 fb⁻¹ of proton-proton data collected at a centre-of-mass energy of 13 TeV. Events with missing transverse momentum associated with at least one highly energetic jet are selected to construct ratios of invisible Z boson decays to Z boson decays into pairs of oppositely charged electrons or muons, respectively. These ratios are corrected for detector effects and are then used in combination with the leptonic Z boson width, determined at LEP, to derive the invisible width of the Z boson, measured to be 506 pm² (stat.) pm¹² (syst.) MeV. This result is in excellent agreement with the Standard Model prediction and with previous measurements, representing the single most precise recoil-based measurement of GZ(inv) to date.

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