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Measurement of the cross-section for $Z^0 \rightarrow e^+e^-$ production in pp collisions at $\sqrt{s} = 7$

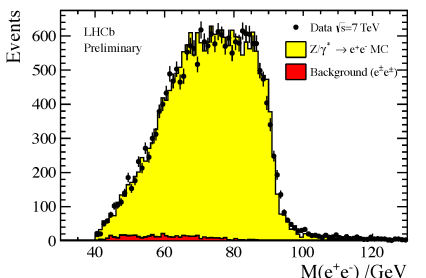
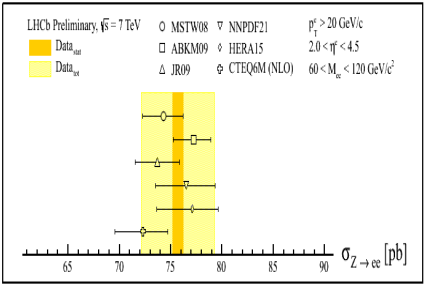
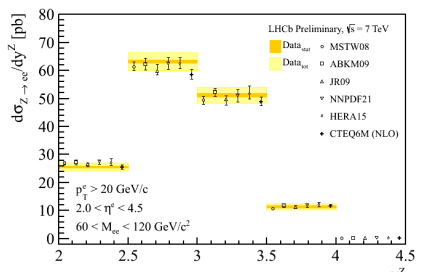
The conference note is available [here](#).

Abstract

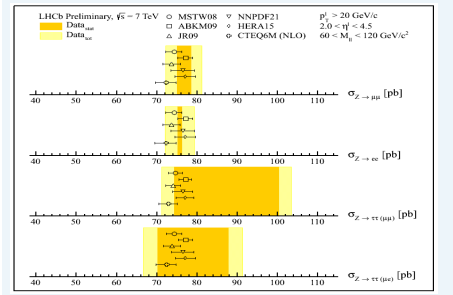
A measurement of the cross-section for $Z^0 \rightarrow e^+e^-$ at $\sqrt{s} = 7$ TeV is presented using LHCb data recorded in 2011 corresponding to an integrated luminosity of 945 pb⁻¹. Within the kinematic acceptance, $p_T > 20$ GeV and $2.0 < \eta < 4.5$ for the leptons and $60 < M < 120$ GeV and $2 < y < 4$ for the Z^0 , the cross-section is measured to be $\sigma(Z^0 \rightarrow e^+e^-) = 75.7 \pm 0.5(\text{stat.}) \pm 2.4(\text{syst.}) \pm 2.6(\text{lumi.})$ pb. The results are compared with previous measurements and with theoretical predictions using QCD at NNLO.

Figures

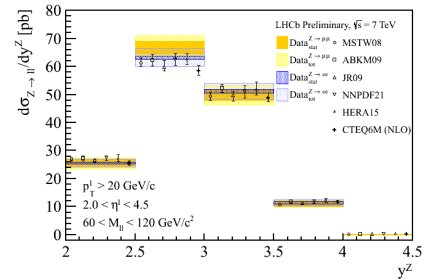
(Note, eps versions are available under attachments).

Caption	Figure
<p>Invariant mass distribution of $Z^0 \rightarrow e^+e^-$ candidates. The data are shown as points with errors, the background obtained from same-sign data is shown in red, to which the expectation from signal simulation is added in yellow. The $+ -$ contribution is also included (though not visible), and the Monte Carlo has been normalised to the (background-subtracted) data.</p>	
<p>The $Z^0 \rightarrow e^+e^-$ production cross-section measured in the 2011 LHCb data, shown as the yellow band. The inner (darker) band represents the statistical error, and the outer the total error. The measurement corresponds to the kinematic acceptance, $p_T > 20$ GeV and $2.0 < \eta < 4.5$ for the leptons and $60 < M < 120$ GeV and $2 < y < 4$ for the Z^0. The points show the various theoretical predictions described in the text, with errors reflecting their (68% confidence level) uncertainties.</p>	
<p>Differential production cross-section for $Z^0 \rightarrow e^+e^-$ in bins of Z^0 rapidity. The measurements based on the 2011 LHCb data are shown as the yellow shaded band, where the inner (darker) band represents the statistical error, and the outer the total error. QCD predictions are compared using the points with error bars reflecting their (68% confidence level) uncertainties. These correspond to the same binning as the data, and are displaced sideways in the interest of clarity.</p>	

$Z0 \rightarrow l+l-$ production cross-sections, shown as the yellow bands. The inner (darker) bands represents the statistical errors, and the outer the total errors. The measurement corresponds to the kinematic acceptance, $p_T > 20$ GeV and $2 < \eta < 4.5$ for the leptons and $60 < M < 120$ GeV and $2 < y < 4$ for the Z0. The points show the various theoretical predictions described in the text, with errors reflecting their (68% confidence level) uncertainties.



Differential production cross-section for $Z0 \rightarrow l+l-$ in bins of Z0 rapidity. The measurements based on electrons in the 2011 data are shown as the blue shaded bands and those based on muon data recorded in 2010 are shown as the yellow bands, where the inner (darker) band represents the statistical error, and the outer the total error. QCD predictions are compared using the points with error bars reflecting their (68% confidence level) uncertainties. These correspond to the same binning as the data, and are displaced sideways in the interest of clarity.



-- TaraShears - 18-Sep-2012

This topic: LHCb > Z2ee

Topic revision: r1 - 2012-09-18 - TaraShears



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