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Observation of associated production of a Z boson with a D meson in the forward region

The paper is available here [↗](#).

LHCB-PAPER-2013-062 [↗](#)

arXiv: 1401.3245

JHEP 4 (2014) 91.

More detailed information ANA note 2013-047 [↗](#)

Abstract

A search for associated production of a Z boson with an open charm meson is presented using a data sample, corresponding to an integrated luminosity of 1.0 fb^{-1} of proton-proton collisions at a centre-of-mass energy of 7 TeV, collected by the LHCb experiment. Seven candidate events for associated production of a Z boson with a D^0 meson and four candidate events for a Z boson with a D^+ meson are observed with a combined significance of 5.1 standard deviations. The production cross-sections in the forward region are measured to be

$$\sigma_{\mu^+\mu^-\rightarrow Z D^0} = 2.50 \pm 1.12 \pm 0.22 \text{ pb}$$

$$\sigma_{\mu^+\mu^-\rightarrow Z D^+} = 0.44 \pm 0.23 \pm 0.03 \text{ pb,}$$

where the first uncertainty is statistical and the second systematic.

Figures

(pdf and eps versions are available under attachments).

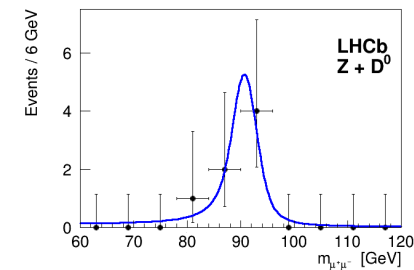
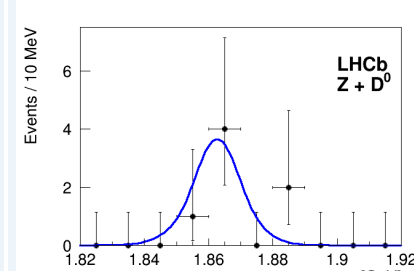
Caption	Figure
Figure 1: Invariant mass distribution for Z (left) and D (right) candidates for Z + D^0 (top) and Z + D^+ (bottom) events. The superimposed curves represent the projection of the fit described in Sect. 4.	
Figure 1 top right	

Figure 1 bottom left

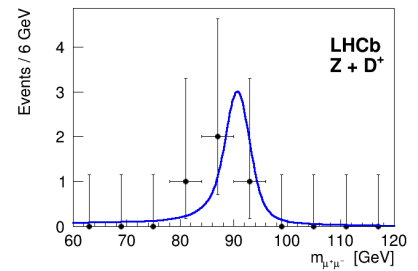


Figure 1 bottom right

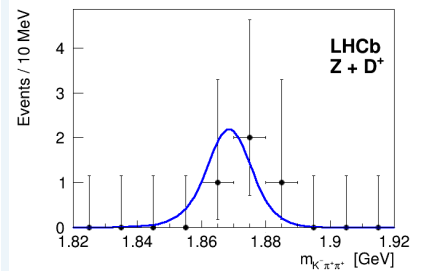
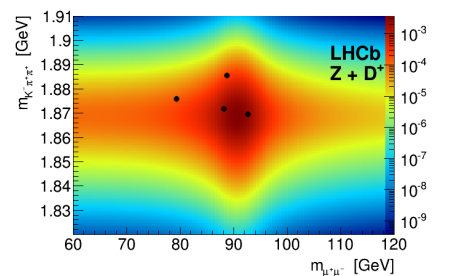
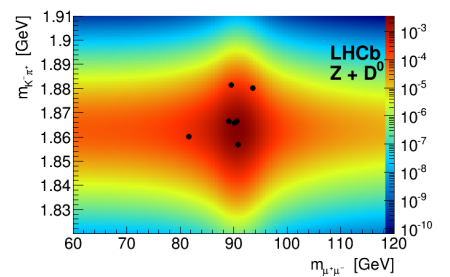
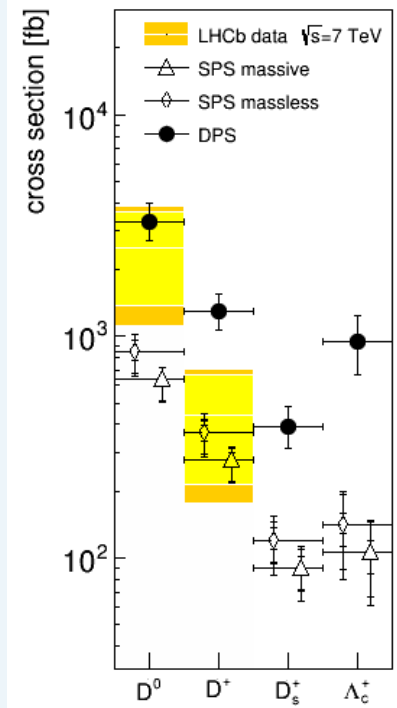


Figure 2: Invariant mass of the Z and D^0 (left) and Z and D^+ (right) candidates (shown as black dots) compared to the fit (see text) that was used to extract the combinatorial background. The fit shown includes the signal and the background components. The colour scale shows the PDF value at any given point.



Supplementary: Graphical comparison to theory predictions. The D_s^+ and D_c^+ states were searched for in the decay channels $D_s^+ \rightarrow (K^+ K^-)$ and $D_c^+ \rightarrow p K^-$ with no observed candidates. The measured cross-section is expected to be the sum of SPS and DPS.



-- KatharinaMueller - 15 Jan 2014

This topic: LHCb > ZplusD11

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