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Search for Higgs-like bosons decaying into long-lived exotic particles

The conference note for the preliminary results is available: [LHCb-CONF-2012-014](#).

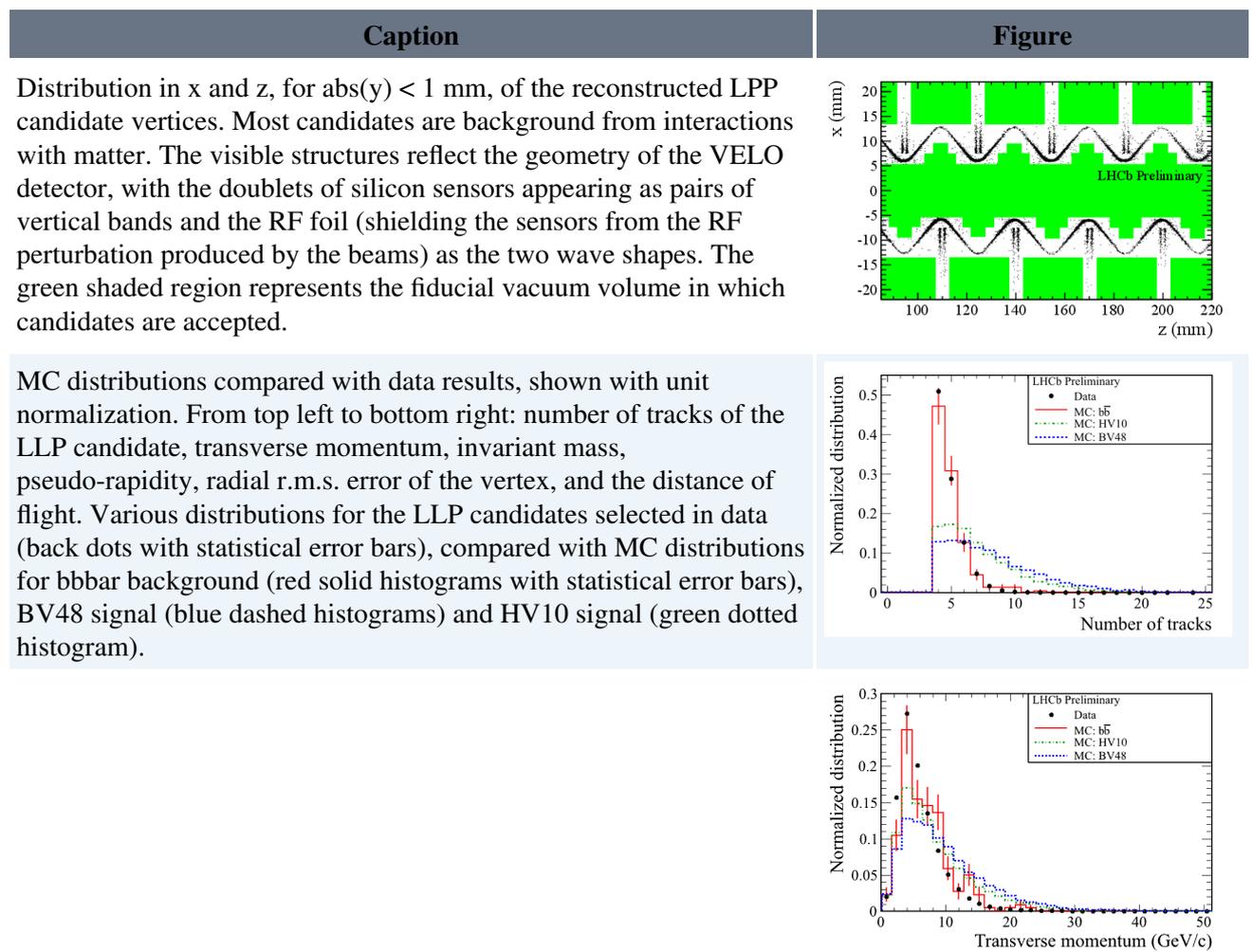
More detailed information: ANA note [2012-038](#)

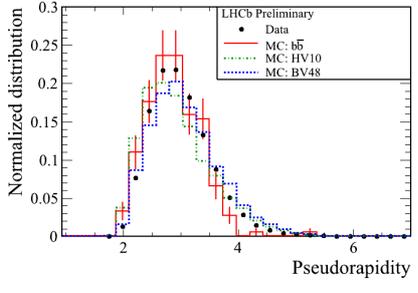
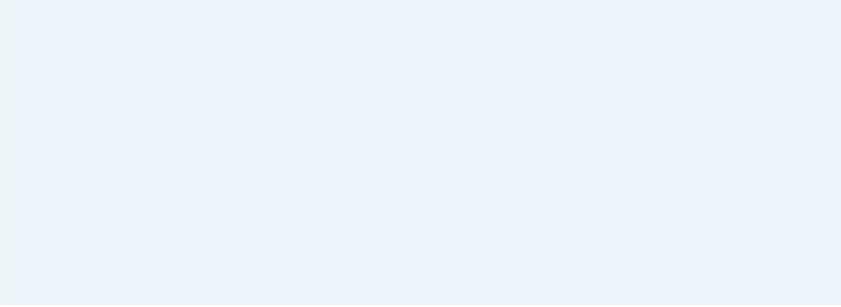
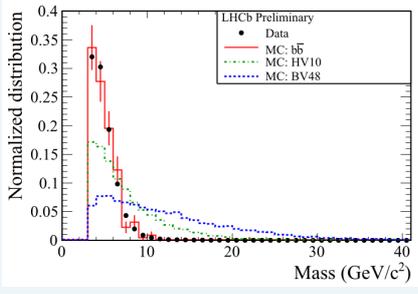
Abstract

Several beyond the Standard Model theoretical models predict the existence of Higgs bosons decaying into heavy long-lived particles. We have analyzed the LHCb data collected from pp collisions at $\sqrt{s} = 7$ TeV in 2010 corresponding to an integrated luminosity of 35.8 pb^{-1} , to identify secondary vertices which can be associated with the decay of such particles. The candidates are subsequently combined to reconstruct the parent bosons. The approximate sensitivity range of this analysis covers long-lived particle lifetimes from 3 to 25 ps, masses between 30 and 55 GeV/c^2 , and parent Higgs masses of 100–125 GeV/c^2 . We do not observe evidence for the production of these long lived states, and set limits on their production times branching ratio.

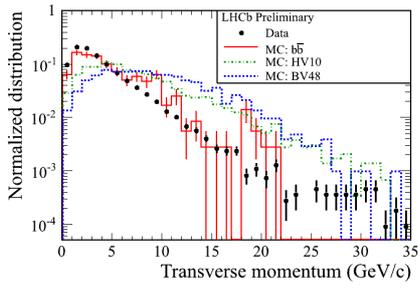
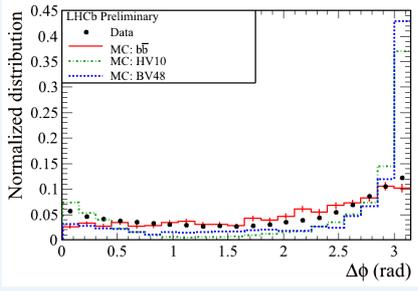
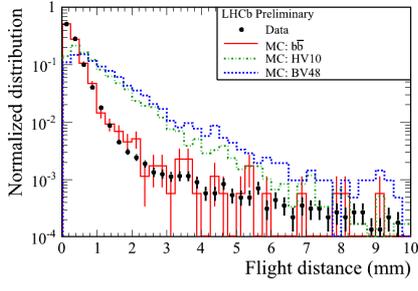
Figures

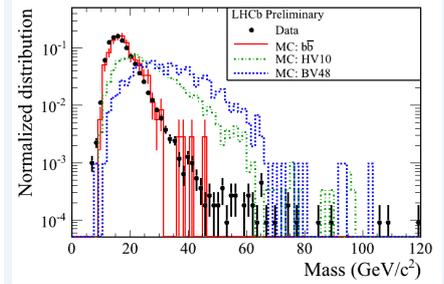
pdf and eps version are available in attachment.



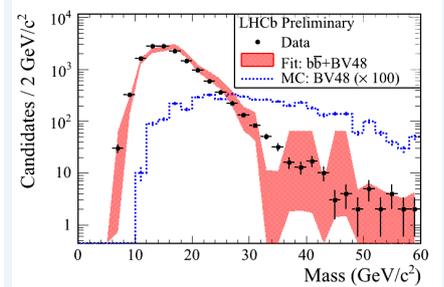
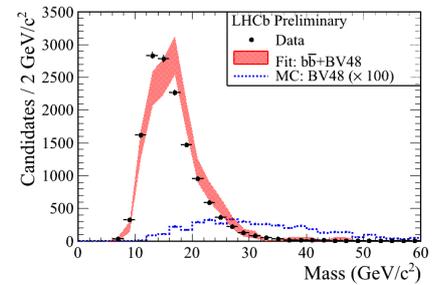


Distributions for pairs of LLP candidates selected in data (black dots with statistical error bars), compared with MC distributions for $b\bar{b}$ background (red solid histograms with statistical error bars), BV48 signal (blue dashed histograms) and HV10 signal (green dotted histogram), each normalized to one. From top to bottom and left to right: azimuthal angle difference, p_T of the pair and invariant mass of the pair.





Mass distribution of the Higgs candidates (black data points), together with the result of the fit (red band reflecting the statistical precision of the model, and dotted blue signal component multiplied by 100).



-- TaraShears - 18-Sep-2012

This topic: LHCb > PrelimDsipIVert

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