

B hadrons Lifetime Cinvestav-Report

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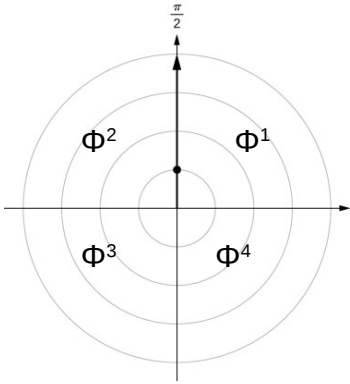


Introduction

- In the ARC-authors meeting they asked us what about $J\psi$ vertex in the MuoniaParked data. we make this test again using the reference channel, B^+ .
- Due to the discrepancies in the B_c lifetime for different charges, the ARC also suggest us to make the same test in the B^+ channel.

Dataset divisions

Using the $B^+ \rightarrow J/\psi K^+$ channel we divide the data sample into parts. We performed these checks using the following cut variables:



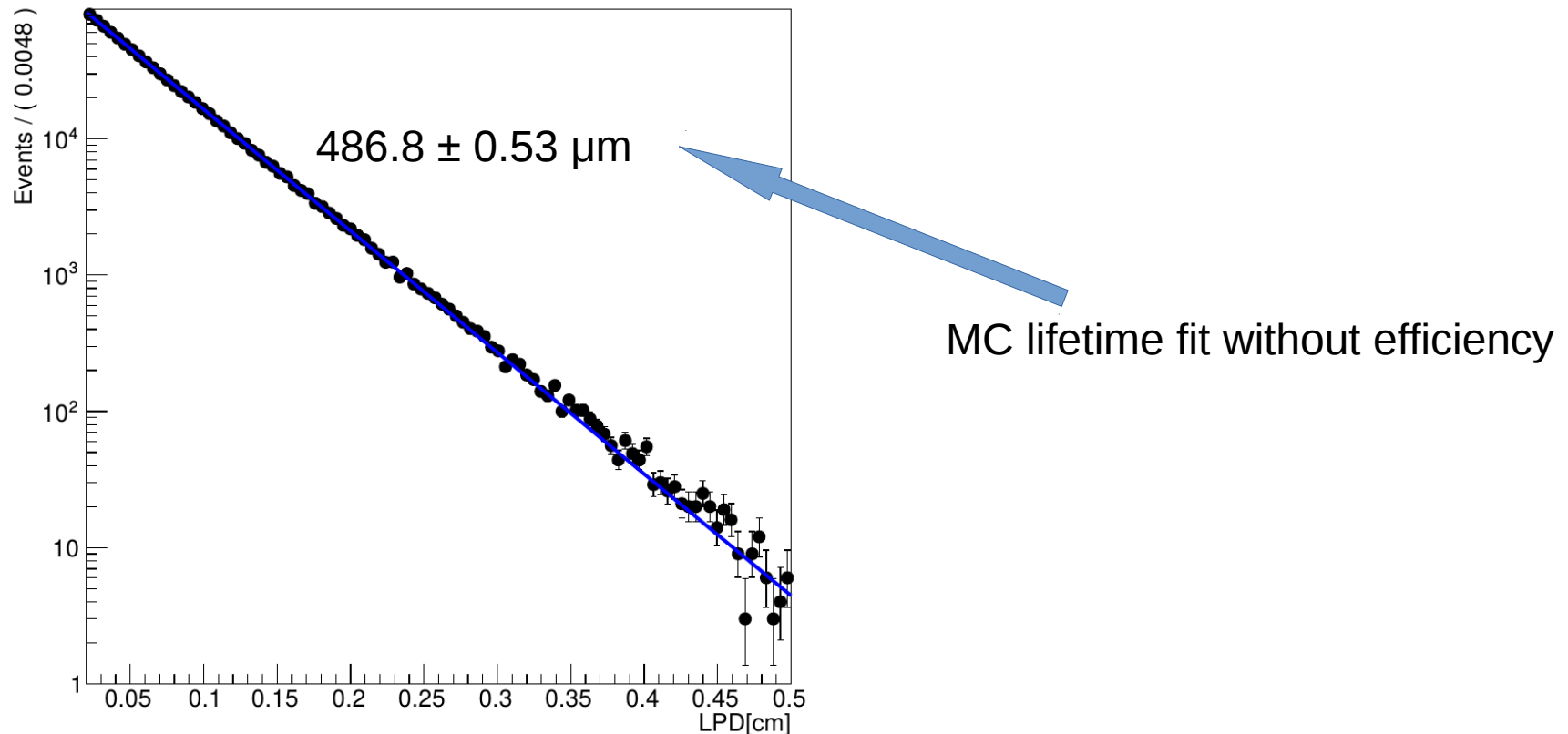
variable	ct (μm)	Deviation (σ)
total	481.6 ± 0.8	0.0
K^+	481.8 ± 1.1	0.1
K^-	481.3 ± 1.1	0.2
ϕ^1	479.2 ± 1.5	1.4
ϕ^2	483.2 ± 1.4	1.0
ϕ^3	484.2 ± 1.4	1.4
ϕ^4	449.6 ± 1.5	1.2
$\eta^-(\text{Endcap})$	478.2 ± 2.8	1.2
$\eta^-(\text{Barrel})$	482.1 ± 1.1	0.4
$\eta^+(\text{Barrel})$	482.8 ± 1.1	0.9
$\eta^+(\text{Endcap})$	478.2 ± 2.4	1.4

$$\sigma = \frac{ct_{\text{nominal}} - ct_{\text{test}}}{\sqrt{\sigma_{\text{nominal}}^2 + \sigma_{\text{test}}^2}}$$

Jpsi vertex

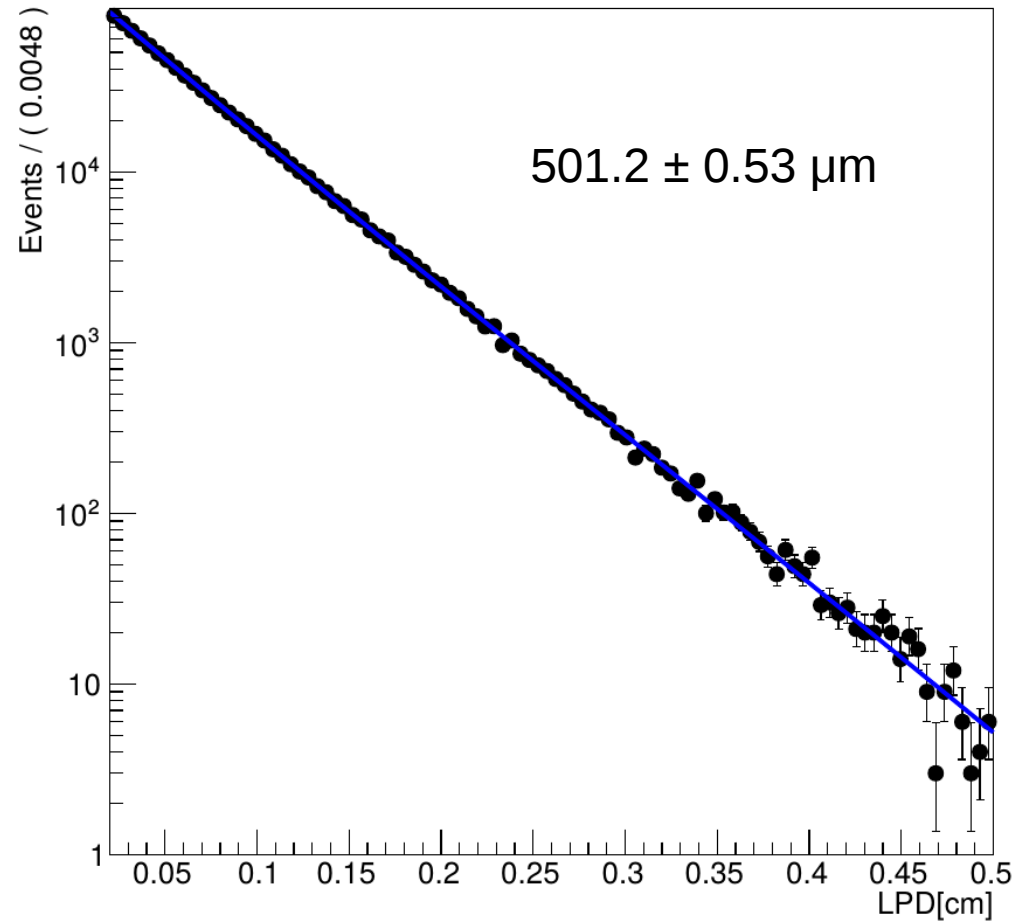
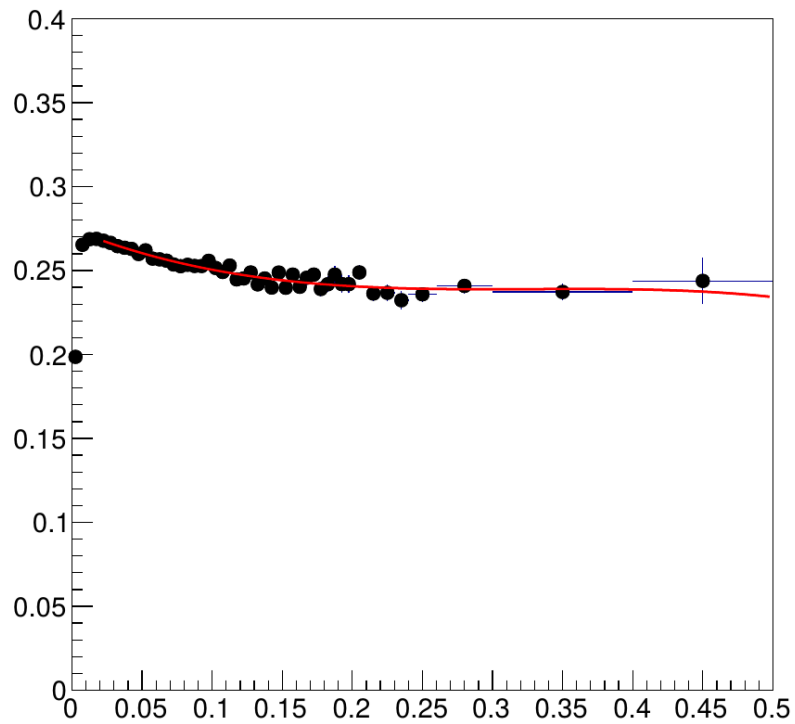
We perform the lifetime measurement by using the decay vertex of the Jpsi instead of the decay vertex of the B.

We follow the same process like in the nominal analysis. we take the efficiency from MC and then use it in data.



MC lifetime fit using efficiency

efficiency



MC lifetime input was 500.9 μm

$B^+ \rightarrow J/\psi K^+$ lifetime. Without efficiency

Dataset	ct (μm)
B	480.78 ± 1.7
C	477.4 ± 1.2
D	476.74 ± 1.1

$B^+ \rightarrow J/\psi K^+$ lifetime. Using efficiency

Dataset	ct (μm)
B	494.8 ± 1.8
C	491.1 ± 1.2
D	490.5 ± 1.2

Jpsi vertex Vs B vertex

lifetime using Jpsi vertex

Dataset	ct (μm)
B	494.8 ± 1.8
C	491.1 ± 1.2
D	490.5 ± 1.2

lifetime using B vertex

B^+ Lifetime fit values for different dataset

Dataset	ct (μm)
B	494.9 ± 1.8
C	491.4 ± 1.1
D	490.5 ± 1.2

summary

- We did not find any statistically significant difference in the dataset division by charge, eta or phi.
- We did not find any statistically significant difference between the measurements using different decay vertex.