



Library Indian Institute of Science Education and Research Mohali



DSpace@IISERMohali (/jspui/)

/ Publications of IISER Mohali (/jspui/handle/123456789/4)

/ Research Articles (/jspui/handle/123456789/9)

Please use this identifier to cite or link to this item: <http://hdl.handle.net/123456789/1674>


Title:	Measurement of $\cos 2\beta$ in $B^0 \rightarrow D^{(*)} h^0$ with $D \rightarrow K^0 S \pi^+ \pi^-$ decays by a combined time-dependent Dalitz plot analysis of BaBar and Belle data
Authors:	Bhardwaj, V. (/jspui/browse?type=author&value=Bhardwaj%2C+V.)
Keywords:	CP violation Belle data $\cos 2\beta$ $B^0 \rightarrow D^{(*)} h^0$ $D \rightarrow K^0 S \pi^+ \pi^-$ time-dependent Dalitz plot
Issue Date:	2018
Publisher:	American Physical Society
Citation:	Physical Review D, 98(11).
Abstract:	We report measurements of $\sin 2\beta$ and $\cos 2\beta$ using a time-dependent Dalitz plot analysis of $B^0 \rightarrow D^{(*)} h^0$ with $D \rightarrow K^0 S \pi^+ \pi^-$ decays, where the light unflavored and neutral hadron h^0 is a π^0 , η , or ω meson. The analysis uses a combination of the final data sets of the BaBar and Belle experiments containing 471×10^6 and 772×10^6 $B^+ B^-$ pairs collected at the $Y(4S)$ resonance at the asymmetric-energy B factories PEP-II at SLAC and KEKB at KEK, respectively. We measure $\sin 2\beta = 0.80 \pm 0.14(\text{stat}) \pm 0.06(\text{syst}) \pm 0.03(\text{model})$ and $\cos 2\beta = 0.91 \pm 0.22(\text{stat}) \pm 0.09(\text{syst}) \pm 0.07(\text{model})$. The result for the direct measurement of the angle is $\beta = (22.5 \pm 4.4(\text{stat}) \pm 1.2(\text{syst}) \pm 0.6(\text{model}))^\circ$. The last quoted uncertainties are due to the composition of the $D^0 \rightarrow K^0 S \pi^+ \pi^-$ decay amplitude model, which is newly established by a Dalitz plot amplitude analysis of a high-statistics $e^+ e^- \rightarrow c \bar{c}$ data sample as part of this analysis. We find the first evidence for $\cos 2\beta > 0$ at the level of 3.7 standard deviations. The measurement excludes the trigonometric multifold solution $\pi/2 - \beta = (68.1 \pm 0.7)^\circ$ at the level of 7.3 standard deviations and therefore resolves an ambiguity in the determination of the apex of the CKM Unitarity Triangle. The hypothesis of $\beta = 0^\circ$ is ruled out at the level of 5.1 standard deviations, and thus CP violation is observed in $B^0 \rightarrow D^{(*)} h^0$ decays. The measurement assumes no direct CP violation in $B^0 \rightarrow D^{(*)} h^0$ decays.
Description:	Only IISERM authors are available in the record.
URI:	https://journals.aps.org/prd/abstract/10.1103/PhysRevD.98.112012 (https://journals.aps.org/prd/abstract/10.1103/PhysRevD.98.112012) http://hdl.handle.net/123456789/1674 (http://hdl.handle.net/123456789/1674)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

Files in This Item:

File	Description	Size	Format
Need to add pdf.odt (/jspui/bitstream/123456789/1674/1/Need%20to%20add%20pdf.odt)		8.04 kB	OpenDocument Text

[View/Open \(/jspui/bitstream/123456789/1674/1/Need%20to%20add%20pdf.odt\)](#)

Show full item record (</jspui/handle/123456789/1674?mode=full>)

 (</jspui/handle/123456789/1674/statistics>)

Items in DSpace are protected by copyright, with all rights reserved, unless otherwise indicated.