Title:	First Evidence for cos2β>0 and Resolution of the Cabibbo-Kobayashi-Maskawa Quark-Mixing Unitarity Triangle Ambiguity
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Abstract:	We present first evidence that the cosine of the CP-violating weak phase 2β is positive, and hence exclude trigonometric multifold solutions of the Cabibbo-Kobayashi-Maskawa (CKM) Unitarity Triangle using a time-dependent Dalitz plot analysis of B0→D(*)h0 with D→K0Sπ+π− decays, where h0∈{π0,η,ω} denotes a light unflavored and neutral hadron. The measurement is performed combining the final data sets of the BABAR and Belle experiments collected at the Y(4S) resonance at the asymmetric-energy B factories PEP-II at SLAC and KEKB at KEK, respectively. The data samples contain (471±3)×106B¯B pairs recorded by the BABAR detector and (772±11)×106B¯B pairs recorded by the Belle detector. The results of the measurement are sin2β=0.80±0.14(stat)±0.06(syst)±0.03(model) and cos2β=0.91±0.22(stat)±0.09(syst) ±0.07(model). The result for the direct measurement of the angle β of the CKM Unitarity Triangle is β=[22.5±4.4(stat)±1.2(syst)±0.6(model)]°. The measurement assumes no direct CP violation in B0→D(*)h0 decays. The quoted model uncertainties are due to the composition of the D0→K0Sπ+π− decay amplitude model, which is newly established by performing a Dalitz plot amplitude analysis using a high-statistics e+e−→c¯c data sample. CP violation is observed in B0→D(*)h0 decays at the level of 5.1 standard deviations. The significance for cos2β>0 is 3.7 standard deviations. The trigonometric multifold solution π/2−β=(68.1±0.7)° is excluded at the level of 7.3 standard deviations. The measurement resolves an ambiguity in the determination of the apex of the CKM Unitarity Triangle.
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