Supplementary material for LHCb-PAPER-2019-032

We combine $A_\Gamma(D^0 \to \pi^+\pi^-)$ and $A_\Gamma(D^0 \to K^+K^-)$ with the previous LHCb measurements reported in Refs. [1] (muon-tagged Run 1 result) and [2] (pion-tagged Run 1 result). We assume the systematic uncertainties due to decay-time resolution to be fully correlated between the Run 1 and Run 2 muon-tagged measurements, while all other uncertainties are assumed to be uncorrelated. Uncertainties of the muon- and pion-tagged analyses are assumed to be uncorrelated. The combined values are

$$A_\Gamma(D^0 \to K^+K^-) = (-4.4 \pm 2.3 \pm 0.6) \times 10^{-4},$$
$$A_\Gamma(D^0 \to \pi^+\pi^-) = (2.5 \pm 4.3 \pm 0.7) \times 10^{-4},$$

where the first uncertainties are statistical and the second systematic. Assuming A_Γ to be universal among the decay channels, we compute the following average between the above two results:

$$A_\Gamma = (-2.9 \pm 2.0 \pm 0.6) \times 10^{-4}.$$

If we also include the preliminary result reported in Ref. [3] in the combination, we get the following preliminary average value:

$$A_\Gamma = (-1.1 \pm 1.7 \pm 0.5) \times 10^{-4}.$$

References

[1] LHCb collaboration, R. Aaij *et al.*, *Measurement of indirect CP asymmetries in $D^0 \to K^-K^+$ and $D^0 \to \pi^-\pi^+$ decays using semileptonic B decays*, JHEP **04** (2015) 043, arXiv:1501.06777.

[2] LHCb collaboration, R. Aaij *et al.*, *Measurement of the CP violation parameter A_Γ in $D^0 \to K^+K^-$ and $D^0 \to \pi^+\pi^-$ decays*, Phys. Rev. Lett. **118** (2017) 261803, arXiv:1702.06490.

[3] LHCb collaboration, *Search for time-dependent CP violation in $D^0 \to K^+K^-$ and $D^0 \to \pi^+\pi^-$ decays*, LHCb-CONF-2019-001, 2019.