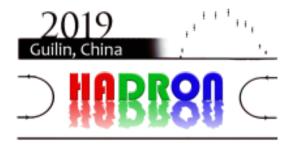
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Quark model explanation of Upsilon(10860)

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The explanation of the large $e^+e^-\to\pi^+\pi^-\Upsilon$ (ns) (n=1,2,3) widths at $\sqrt{s}=10.866\pm0.002$ GeV near the Υ (10860) peak [1], about two orders of magnitude larger than those for Υ $(ns)\to\pi^+\pi^-\Upsilon$ (1s) (n=2,3,4), has been in recent years a theoretical challenge (see for example [2]) despite the quite natural (according to its mass) asignment of

 Υ (10860) to the

standard $\Upsilon\left(5s\right)$ quark model state. Moreover, the

experimental production rates of

 $\Upsilon (10860) \to \pi^+ \pi^- h_b (np)$

(n = 1, 2) and

 $\Upsilon(10860) \to \pi^+\pi^-\Upsilon(ns)$ are of the same order of magnitude whereas the calculated

 $\Upsilon\left(5s\right) \to \pi^{+}\pi^{-}h_{b}\left(np\right)$ rates are suppressed

against

 $\Upsilon\left(5s\right) \to \pi^{+}\pi^{-}\Upsilon\left(ns\right)$ ones by Heavy Quark Spin Symmetry.

We show that a good quantitative description of the

 Υ (10860) mass, its

 e^+e^- leptonic width and its

 $\pi^+\pi^-\Upsilon(ns)$ production rates, as well as a qualitative

understanding of its

 $\pi^{+}\pi^{-}h_{b}\left(np\right)$ production rates can be obtained under the assumption that

 Υ (10860) is a mixture of the conventional

 $\Upsilon(5s)$ quark model state with a small proportion of the lowest

1⁻⁻ hybrid state [3].

[1] M. Tanabashi et al. (Particle Data Group (PDG)), Phys. Rev. D98, 030001 (2018).

[2] L. Olsen, T. Skwarnicki, and D. Zieminska, Rev.Mod.Phys.90,015003 (2018).

[3] R. Bruschini and P. Gonzalez, Pys. Lett. B791,409 (2019).

Primary author: Prof. GONZÁLEZ, pedro (Dep. Física Teórica and IFIC, Fac. Física, Univ. Valencia)

Co-author: Mr BRUSCHINI, Roberto (IFIC, CSIC - Univ. Valencia)

Presenter: Prof. GONZÁLEZ, pedro (Dep. Física Teórica and IFIC, Fac. Física, Univ. Valencia)

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