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Is the X(3872) a molecule?

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Recently, we have successfully described [1] the controversial X(3872)
charmonium resonance as a normal axial-vector ($J^{PC} = 1^{++}$) $c\bar{c}$ state, but non-perturbatively unitarised and mass-shifted owing to several OZI-allowed and OZI-suppressed decay channels. Nevertheless, many authors still consider the X(3872) a meson-meson molecule, due to its very close proximity to the D^0D^{*0} threshold. It is argued [2] that, because of this closeness, the X(3872) will have a molecular-type wave function, with a strongly dominant D^0D^{*0} component, irrespective of the mechanism creating the state.

In this talk, I shall present results from a simplified study of this issue, employing a two-channel model, i.e., one channel for the confined axial-vector $c\bar{c}$ state and another for the dominant S-wave D^0D^{*0} decay component. Harmonic-oscillator wave functions will be used for the confinement part and a delta-shell potential for transitions between the $c\bar{c}$ and D^0D^{*0} channels, thus mimicking string breaking that gives rise to $^3P_0$ quark-pair creation. Probabilities of the two wave-function components will be computed as in Ref. [3], for different bound-state pole positions
approaching the D^0D^{*0} threshold from below.

[1] Susana Coito, George Rupp, and Eef van Beveren, Eur. Phys. J. C 71
(2011) 1762 [arXiv:1008.5100 [hep-ph]].
[2] Eric Braaten and Meng Lu, Phys. Rev. D 76 (2007) 094028
[arXiv:0709.2697 [hep-ph]].
[3] E. van Beveren, C. Dullemond, and T.A. Rijken, Z. Phys. C 19
(1983) 275.

Primary author: COITO, Susana (IST-Lisbon)

Co-authors: Prof. VAN BEVEREN, Eef (CFC-Universidade de Coimbra); RUPP, George (IST)

Presenter: COITO, Susana (IST-Lisbon)