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Implications of the D+s $\rightarrow \pi + \pi 0\eta$ decay in the nature of a0(980) and molecular interpretation of the new X0(2900)

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In a recent paper \cite{Ablikim:2019pit}, the BESIII collaboration reported the so-called first observation of pure W-annihilation decays $D+s \rightarrow a+0(980)\pi 0$ and $D+s \rightarrow a00(980)\pi +$. The measured absolute branching fractions are, however, puzzlingly larger than those of other measured pure W-annihilation decays by at least one order of magnitude. In addition, the relative phase between the two decay modes is found to be about 180 degrees. In this letter, we show that all these can be easily understood if the a0(980) is a dynamically generated state from K⁻K and $\pi\eta$ interactions in coupled channels. In such a scenario, the D+s decay proceeds via internal W emission instead of W-annihilation, which has a larger decay rate than W-annihilation. The proposed decay mechanism and the molecular nature of the a0(980) also provide a natural explanation to the measured negative interference between the two decay modes. In addition, the molecular interpretation of the new flavor exotic meson, the X0(2900), is revisited, including a discussion on its possible decay modes.

Presenter: MOLINA PERALTA, Raquel (IFIC-UV)