

# Probing the structure of $\chi_{c1}(3872)$ : heavy quark symmetries at work

*Tuesday, 17 December 2024 12:00 (20 minutes)*

Since 2003, a number of hadronic states have been observed with properties that challenge their classification as predicted by the quark model. Many of these states have a charm-anticharm component in their quark content and are therefore referred to as charmonium-like states.

The first of these states,  $\chi_{c1}(3872)$ , was observed in 2003 by the Belle collaboration. This observation has been confirmed by several other experiments.

More than twenty years have elapsed since the discovery of  $\chi_{c1}(3872)$ , and a great amount of theoretical and experimental efforts have been devoted to studying its properties, decays, and production mechanisms. Despite this extensive work, a full understanding of the structure of this state is still missing. Moreover, several other charmonium-like states have been observed that need to be properly identified.

In this talk, I discuss how, exploiting the heavy quark large mass limit, it is possible to analyze radiative decays of  $\chi_{c1}(3872)$  to S-wave charmonia assuming that it is an ordinary charmonium state. The interest lies in the fact that these modes have been recognized as useful probes for understanding the nature of this state.

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