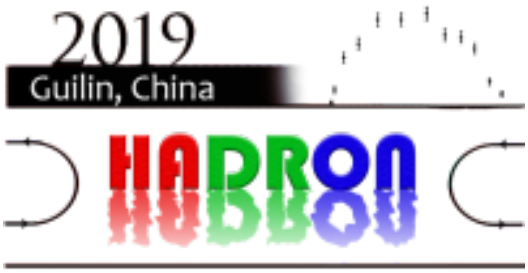

Contribution ID: **181** Type: **Parallel**

Relativistic effects in radiative charmonium transitions: A covariant quark model approach

Wednesday, 21 August 2019 09:55 (20 minutes)

Radiative transitions between charmonium states have been widely studied theoretically and experimentally as probes reflecting their internal structure.
In particular, since the constituent quark model can classify the excited states systematically, it has been useful tools for exploring undiscovered states and determining the quantum number of newly observed states.

In recent years, the BES III collaboration has reported the latest experimental results on $\psi(3770) \to \chi_{cJ}\gamma$, $\psi(3686) \to \chi_{c1,2}\gamma$ and $\chi_{cJ} \to J/\psi\gamma$.
These results clearly show quark models with relativistic-/coupled channel-/higher-order multipole-corrections taken into account better reproduce the experimental data than conventional simple models.

In this work, we investigate the radiative transitions of charmonium system in the framework of the relativistic covariant quark model where the center of mass motion of the system is treated in a manifestly covariant way.
We discuss in detail the corrections caused by boosting of the center of mass, the deformation of the form factor due to the Lorentz contraction, and the contribution of higher-order multipoles, in comparison with the simple non-relativistic model. We will also discuss the verification of our results by future experiments.

Primary author: Dr MAEDA, Tomohito (Nihon University)

Co-authors: Prof. YAMADA, Kenji (Nihon University); Dr ODA, Masuho (Nihon University); Dr KOMADA, Toshihiko (Nihon University)

Presenter: Dr MAEDA, Tomohito (Nihon University)

Session Classification: Session 1: Meson spectroscopy

Track Classification: Session 1: Meson spectroscopy