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Intrinsic Heavy Flavor Production of Tetraquarks

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A number of new four-quark states containing from one to four c or \bar{c} quarks have been observed recently. Many of these new states have been discovered at the LHC. The production of these states via intrinsic charm in the proton is investigated. The tetraquark masses obtained in this approach agree well with the measured masses [1]. These calculations can provide some insight into the nature of the tetraquark candidates, whether as a bound meson pair or as a looser configuration of four individual partons which can influence their interactions in the nuclear medium, such as in heavy-ion collisions. The kinematic distributions of these states as a function of y and p_T are also studied. Previous investigations [2-4] show that J/ψ and \bar{D} mesons produced from such states manifest themselves at forward rapidity and relatively high p_T . The extension to bottom tetraquark candidates is also considered.

- [1] R. Vogt, Tetraquarks from Intrinsic Heavy Quarks, Phys. Rev. D in press, arXiv:2405.09018 [hep-ph].
- [2] R. Vogt, Limits on Intrinsic Charm Production from the SeaQuest Experiment, Phys. Rev. C **103** (2021), 035204.
- [3] R. Vogt, Energy dependence of intrinsic charm production: Determining the best energy for observation, Phys. Rev. C **106** (2022) 025201.
- [4] Contribution from intrinsic charm production to fixed-target interactions with the SMOG Device at LHCb, Phys. Rev. C **108**, 015201 (2023).

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Category

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Author: VOGT, Ramona (LLNL and UC Davis)

Presenter: VOGT, Ramona (LLNL and UC Davis)

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