Contribution ID: **11** Type: **not specified**

Investigation of two-particle contributions to nucleon matrix elements

Monday, 30 October 2023 14:30 (20 minutes)

We investigate contributions of excited states to nucleon matrix elements by studying the two- and three-point functions using nucleon and pion-nucleon interpolating fields. This study is made using twisted mass fermion ensembles with pion masses 346 MeV and 131 MeV. We construct an improved nucleon interpolating field with the generalized eigenvalue problem of two-point functions, and use it to study three-point functions. This method itself is also discussed in more details. We compare results obtained using these two ensembles and show preliminary results for nucleon charges.

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Session Classification: Research Talks

Track Classification: Student and Postdoc Talks: Student and Postdoc Talks