

Abstract Submitted  
for the DNP20 Meeting of  
The American Physical Society

**Probing nucleon strange and charm distributions with lattice QCD**<sup>1</sup> RUI ZHANG, HUEY-WEN LIN, Michigan State University, BORAM YOON, LANL — We present the first lattice-QCD calculation of the unpolarized strange and charm parton distribution functions using large-momentum effective theory (LaMET). We use a lattice ensemble with 2+1+1 flavors of highly improved staggered quarks (HISQ) generated by MILC collaboration, with lattice spacing  $a \approx 0.12$  fm and  $M_\pi \approx 310$  MeV, and clover valence fermions with two valence pion masses: 310 and 690 MeV. We use momentum-smearred sources to improve the signal up to nucleon boost momentum  $P_z = 2.18$  GeV, and determine nonperturbative renormalization factors in RI/MOM scheme. We compare our lattice results with the matrix elements obtained from matching the PDFs from CT18NNLO and NNPDF3.1NNLO global fits. Our data support the assumptions of strange-antistrange and charm-anticharm symmetry that are commonly used in global PDF fits, and we find smaller than expected parton distribution at mid to small  $x$ .

<sup>1</sup>US National Science Foundation grant PHY 1653405 CAREER: Constraining Parton Distribution Functions for New-Physics Searches

Rui Zhang  
Michigan State University

Date submitted: 26 Jun 2020

Electronic form version 1.4