



国立研究開発法人理化学研究所 仁科加速器科学研究センター  
第317回 RIBF核物理セミナー  
RIKEN Nishina Center for Accelerator Based Science  
The 317th RIBF Nuclear Physics Seminar

## Fixed-target charmonium production and pion PDFs

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The pion, as the Goldstone boson of dynamical chiral symmetry breaking of the strong interaction, is the lightest QCD bound state. Because of its light mass, pion plays a dominant role in the long-range nucleon-nucleon interaction. Understanding the pion's internal structure is important to investigate the low-energy, non-perturbative aspects of QCD. Nevertheless, the uncertainties of partonic density functions (PDFs) of pions are relatively huge due to lacking rest pion targets.

In this talk, we will review recent theoretical and experimental progress of extracting the pion PDFs. Furthermore, we will provide quantitative evidence within the CEM and NRQCD frameworks that the existing pion-induced fixed-target J/psi and psi (2S) data are sensitive to the gluon density of pions, and favor the pion PDFs with relatively large gluon contents at large x.

### References

- [1] W.C. Chang, J.C. Peng, S. Platchkov, and T. Sawada, Phys. Rev. D 102, 054024 (2020); arXiv:2006.06947.
- [2] C.Y. Hsieh, Y.S. Lian, W.C. Chang, J.C. Peng, S. Platchkov, and T. Sawada, Chin. J. Phys. 73, 13 (2021); arXiv:2103.11660.
- [3] W.C. Chang, J.C. Peng, S. Platchkov, and T. Sawada, arXiv: 2209.04072 (PRD accepted).

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via Seminar Room 224  
2F Main Research Bldg.



\* The talk will be given in English language.

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