Xianglong Song (宋相龙)

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Education

School of Physics, Nankai University ***Tianjin, China***

Undergraduate; In Boling class of physics, an ***Honors College****.* *Sept. 2021 - Current*

Major GPA 3.76/4; GPA 3.6/4.

Publication

Pion to two photons transition form factor. (awaiting submission)

Experience and Research

Nankai University *May. 2022 - Jul. 2022*

Solving the gap equation of the NJL model through iterations: unexpected chaos. *Tianjin, China*

- We explored the behavior of the iterative procedure to obtain the solution to the gap equation of the NLJ model for arbitrarily large values of the coupling constant.
- Solved the equation numerically with Mathematica to verify the emergence of chaos.
- Supervised by **Prof. Lei Chang**.

Nankai University *Sep. 2022 - Nov. 2022*

Research about contour deformation for computing light-front quantities. *Tianjin, China*

- It was based on contour deformations combined with analytic continuation methods to project the Bethe-Salpeter wave function onto the light front.
- Applied the new contour deformation method on the generalization to unequal masses in the BSE and implementation of complex conjugate propagator singularities.
- Supervised by **Prof. Lei Chang**.

Nankai University *Apr. 2023 - Apr. 2024*

Extrapolate lattice pion DA and test its effect on the $\pi - \gamma$ transition form factor. *Tianjin, China*

- We constructed a type of effective model that inversely deduces the π meson's Bethe-Salpeter amplitude (BSA) from its distribution amplitude, and subsequently calculated the $\pi - \gamma$ transition form factor.
- Solved the parton distribution amplitude (PDA) inversely with Mathematica (FeynCalc).
- Supervised by **Prof. Lei Chang**.
- **Publication: Pion to two photons transition form factor.** (awaiting submission)

Sapienza Università di Roma *Jul. 2023 - Dec. 2023*

SoftDrop isolation on exploring QED splitting function. *Rome, Italy*

- Used SoftDrop isolation to explore the QED splitting function in $q \to q\gamma$ process.
- Generated splittings with Pythia, wrote macros in C++ using FastJet and plotted with Root.

- SoftDrop isolation did well in distinguishing photons from mesons' decay and quarks.
- Supervised by **Prof. Letícia Cunqueiro**.

Tsung-Dao Lee Institute, Shanghai Jiao Tong University *Jan. 2024*

From multi-wavelength data to electron distribution. *Shanghai, China*

- The Crab Nebula is generally the brightest persistent γ-ray source in the sky, up to 100 TeV, even at a PeV energy scale.
- We used Naima package to calculate LHAASO data and generated the photon spectrum we got from the Crab Nebula and analyzed the origin of these photons.
- Supervised by **Prof. Gwenael Giacinti**.

—— *Forthcoming Research* ——

SLAC National Accelerator Laboratory *Jul. 2024 - Dec. 2024 (tentative)*

ttH+tH CP analysis on ATLAS. *California, USA*

- I will train a neural network to separate ttH+tH signal from background processes and to separate events produced by CP-even and CP-odd process simultaneously (and study other training strategies).
- Would be supervised by **Prof. Caterina Vernieri**.

Technical Skills

Programming Language: C++, Wolfram (Mathematica), Python, LaTeX, Matlab.
Software Package: Root, FastJet, Pythia, Naima.

Teaching Assistant

Nankai University *Fall. 2022 - Spring. 2023*

Linear Algebra *Tianjin, China*

- I served as the **lead TA** for the compulsory course *Linear Algebra* within the School of Chemistry at Nankai University. The course was taught by Prof. Yunhua Xue from the School of Mathematics.

Extracurricular Activity

I am a member of the badminton team representing the School of Physics at Nankai University. I have held the position of **team leader** during the fall semester of 2022 and the spring semester of 2023.