



SPeCial4Young

# SYSU-PKU Collider physics forum For Young scientists



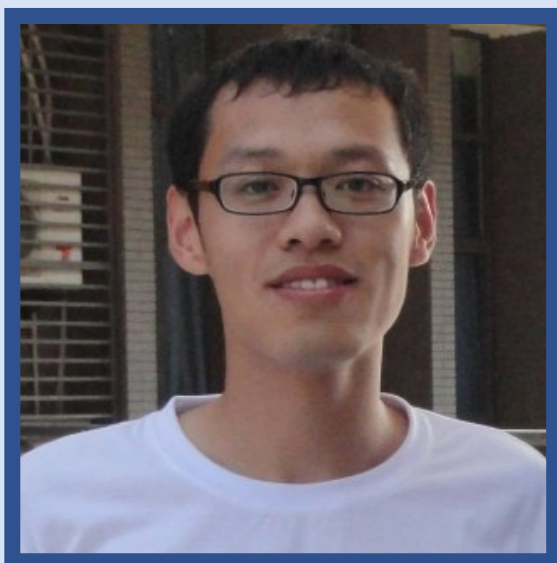
## 中山-北大联合高能物理青年论坛第十五期

自希格斯玻色子发现后，标准模型预言的粒子都已被找到。然而近些年来，在实验中发现越来越多与标准模型不符合的迹象，例如中微子质量、轻子味道普适性破坏以及CDF实验测量W玻色子质量反常等问题。这些“乌云”催促我们去寻找标准模型之外的新物理。高能物理界提出了各种不同的未来实验项目，例如基于LHC对撞机的升级计划（HL-LHC、HE-LHC）、未来环形对撞机（FCC、SPPC）、国际直线对撞机（ILC）、紧凑型直线对撞机（CLIC）、环形正负电子对撞机（CEPC）、缪子对撞机（MuC）、电子-缪子乃至电子-中微子对撞机等。

本论坛目的在于为高能物理工作者提供平台交流其在高能物理前沿的进展与经验，包括但不限于对撞机技术、软件模拟、物理分析等，同时也为高年级本科生及研究生提供接触高能物理前沿的机会。

**报告题目:** Higgs decay to charmonia and the charm-quark Yukawa coupling

**摘要:** With the discovery of the Higgs boson at the CERN Large Hadron Collider (LHC), the particle spectrum of the Standard Model (SM) is complete. The next target at the energy frontier will be to study the Higgs properties and to search for the next scale beyond the SM. Experimentally, the  $H \rightarrow c\bar{c}$  channel would be extremely difficult to dig out because of both the weak Yukawa coupling and the daunting SM di-jet background. We propose to test the charm-quark Yukawa coupling at the LHC and future hadron colliders with the Higgs boson decay to  $J/\psi$  via the charm-quark fragmentation. Using the non-relativistic quantum chromodynamics (NRQCD), we study the Higgs decay channel  $H \rightarrow c\bar{c} + J/\psi$  (or  $\eta_c$ ), where both the color-singlet and color-octet contributions are considered. Our result opens another door to improve determinations at the LHC of the Higgs Yukawa couplings: the final state from this decay mode is quite distinctive with  $J/\psi \rightarrow e\mu$  and the  $J/\psi \rightarrow e^+e^-, \mu^+\mu^-$  branching fraction is enhanced by the charm-quark fragmentation mechanism.



**报告人简介:** 马杨, a Ph.D. student from the University of Pittsburgh. Yang has passed his Ph.D defense very recently and will move to Italy to serve as a postdoc researcher at INFN Bologna. In his early career, Yang was working with Prof. Stan Brodsky from the SLAC on QCD. After joining Pitt in 2016, he started working with Prof. Tao Han on collider phenomenology, QCD, electroweak physics and Higgs physics.

**时间:** 9月5日 周三 19:00 ---19:30, 线上

**会议ID:** 487 887 1035 (Zoom) Passcode: 527772

Indico: <https://indico.ihep.ac.cn/event/17319/>

Meeting link: <https://cern.zoom.us/j/4878871035?pwd=SjJuekR3cnBueUx3Y1pvUzl6QkZNUt09>

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