PHY 959 (Sec. 301):
Collider Phenomenology of New Physics Models

Time & Place:

Fall 2024, 3:40pm – 5:30pm, Wednesday and Friday
October 13 – December 8, 2024
Room 3213 in BPS Bldg.

Instructor:

Name & Title:	C.–P. Yuan, Professor
Office:	3213 Biomedical & Physical Sciences Bldg. Department of Physics and Astronomy
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Office Hours:	3:40pm – 5:30pm, Monday (Or you can just drop by my office at any time.)

Topics To be covered:

This is the continuation of the course PHY-959 (Sec. 301) that I taught in the first part of fall 2023, "Collider Phenomenology", in which we focused on the collider phenomenology of the Standard Model of Particle Physics.

In this new course, I will discuss New Physics beyond the Standard Model and their implication to collider phenomenology.

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* Extension of the Standard Model with extra
  ( spin-0, spin-1/2, spin-1 ) particles
* Extended Gauge symmetry
  ( Su(3)xSU(2)xU(1)xU(1), SU(3)xSU(2)xSU(2)xU(1),
            SU(3)xSU(3)xSu(2)xU(1),
        Two-Higgs doublet model, left-right model )
* Grand unified theory and proton decay
* Supersymmetry and dark matter candidate
* Extra dimension models
* Strongly interacting models
* Effective theories at weak scale
SMEFT (Standard Model Effective Field Theory) and
hEFT (Higgs Effective Field Theory)
* The smoking gun of new physics at the LHC
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Grading: Reports on team projects (100%)