Yen-Hsun Lin

Curriculum Vitae

Institute of Physics, Academia Sinica
No. 128, Section 2 Academia Road
Nangang District, Taipei City, 115, Taiwan

yenhsun@phys.ncku.edu.tw
+886-2-2789 8387
0000-0001-7911-7591
yenhsunlin.github.io

Research Summary

I am an astroparticle physicist with expertise in multimessenger astronomy and dark matter (DM) detection. My research focuses on *three key areas*: (1) supernova-neutrino-boosted DM, (2) anomalous heating from DM in compact stars, and (3) probing DM self-interactions and DM-nucleon interactions in stars and planets. The first area is particularly vital as it opens the *new possibility* for direct DM mass measurements using *time-of-flight techniques*. I also collaborate with DUNE/COHERENT members and work on reducing systematic uncertainties in DUNE-like detectors. Additionally, I contributed to the JUNO collaboration, assessing its data analysis to solar-captured DM. My background in astroparticle physics and extensive research experience have provided me with a deep understanding of DM and its broader implications to our Universe.

Topic of Interest

Astroparticle physics, dark matter physics, supernova and compact star physics, high performance computation, Bayesian inference, and Monte Carlo simulation.

Programming

Python, Cython, C++, Mathematica and Matlab.

Education

National Chiao Tung University — Hsinchu, Taiwan
PhD of the Institute of Physics — Aug. 2011 – Jul. 2016
Thesis: Indirect detection of dark matter through neutrinos
Advisor: Prof. Guey-Lin Lin

National Chiao Tung University — Hsinchu, Taiwan
Master of the Institute of Physics (direct to PhD program) — Aug. 2010 – Jul. 2011
Advisor: Prof. Guey-Lin Lin

National Chiao Tung University — Hsinchu, Taiwan
Bachelor of the Department of Electrophysics — Aug. 2006 – Jul. 2010

Experience

Postdoctoral Scholar — Taipei, Taiwan
Institute of Physics, Academia Sinica — Aug. 2023 – Present
Host: Dr. Meng-Ru Wu

Visiting Scholar — Melbourne, Australia
School of Physics, Melbourne University — Oct. 2023 – Nov. 2023
Host: Prof. Nicole F. Bell

Postdoctoral Scholar — Taipei, Taiwan
Physics Division, National Center for Theoretical Sciences — Dec. 2021 – Jul. 2023

Distinguished Postdoctoral Scholar — Taipei, Taiwan
Institute of Physics, Academia Sinica — Aug. 2019 – Dec. 2021
Host: Dr. Meng-Ru Wu

Postdoctoral Researcher — Tainan, Taiwan
Department of Physics, National Cheng Kung University — Oct. 2017 – Jul. 2019
Host: Prof. Chuan-Hung Chen

Honors & Awards

1. **Postdoctoral Academic Research Award** — Taiwan, 2024
   Awarded by the Division of Particles and Fields, Taiwan Physical Society.
2. **NCTS Postdoc Paper Award** — Taiwan, 2024
   Awarded by the Physics Division, National Center for Theoretical Sciences (NCTS).
3. **Best Research Paper Award for Junior Research Investigator**
   Awarded by the Institute of Physics, Academia Sinica. — Taiwan, 2024
4. **Selected Participant of the 13$^{\text{th}}$ HOPE Meeting with Nobel Laureates**
   Representative of Taiwan. — Japan, 2022
5. **Distinguished Postdoctoral Scholar** — Taiwan, 2019
   Independent position with grant, selected by the Academia Sinica.
6. **Postgraduate Student Thesis Award** — Taiwan, 2017
   Selected as the best PhD thesis of the year in physical sciences, awarded by the Taiwan Physical Society.
7. **Selected Honorary Member of the Phi Tau Phi Scholastic Society**
   Issued to the student graduated with top score. — Taiwan, 2016

Collaboration Membership

1. With Members of DUNE/COHERENT Collaborations — USA
   - ◇ Collaborating with Dr. Gianluca Petrillo and Dr. Yun-Tse Tsai — 2020 – 2024
   - ◇ Analysis the impact due to ν_e-Ar cross section uncertainty
   - ◇ Improving pinched parameter sensitivity via Machine Learning

2. Jiangmen Underground Neutrino Observatory (JUNO) Jiangmen, China
   - ◇ Co-author of the JUNO Yellow Book (R&D tech notes) 2015 – 2016
   - ◇ Sensitivity projection for the solar-captured DM in JUNO

Advisees

PhD students

1. **Vo Quang Nhat** Hsinchu, Taiwna
   Institute of Physics, NYCU Aug. 2022 – Jul. 2023
   Co-supervising with Prof. Guey-Lin Lin

2. **Lam Thi To Uyen** Hsinchu, Taiwna
   Institute of Physics, NYCU Aug. 2022 – Jul. 2023
   Co-supervising with Prof. Guey-Lin Lin

Undergraduates

1. **Tsung-Han Tsai** (ASIoP Summer Student Program) Hsinchu, Taiwna
   Department of Physics, NTHU Jul. 2022 – Aug. 2022
   Co-supervising with Dr. Meng-Ru Wu and work published in *Phys. Rev. D* **108**, 083013 (2023). Tsung-Han has received an offer for enrollment in the PhD program at UW Madison (US).

2. **Yong Sheng Yap** (ASIoP Summer Student Program) Hsinchu, Taiwna
   Department of Physics, NTHU Jul. 2021 – Aug. 2021
   Co-supervising with Dr. Meng-Ru Wu and currently a PhD student in Cambridge University (UK).

3. **Wen-Hua Wu** (ASIoP Summer Student Program) Taipei, Taiwna
   Department of Physics, NTU Jul. 2020 – Aug. 2020
   Co-supervising with Dr. Meng-Ru Wu and work published in *Phys. Rev. Lett.* **130**, 111002 (2023). Currently a PhD student in Rice University (US).

4. **Adeela Malik** (SLAC Summer Student Program) San Antonio, USA
   Department of Physics, University of Texas at San Antonio Jul. 2020 – Aug. 2020
   Co-supervising with and Prof. Hirohisa Tanaka (SLAC) and Dr. Yun-Tse Tsai (SLAC).

Github Repositories

- `snorer`: ***S*pernova-*N*eutrino-b*O*osted da*R*k matt*ER***
  Description: Evaluating the time-of-flight signatures of boosted dark matter due to supernova neutrinos from Milky Way, SN1987a and arbitrary distant galaxy.
  Role: Main developer and maintainer
  Project Page: `https://github.com/yenhsunlin/snorer`

- `dukes`: ***D*iff*U*se-boosted dar*K* matt*E*r by *S*upernova neutrinos**
  Description: Evaluating the signatures of diffuse boosted dark matter by supernova neutrinos in the early Universe.

Role: Main developer and maintainer
Project Page: `https://github.com/yenhsunlin/dukes`

- `dynesor`: ***DY*namical *NE*sted *S*ampling integrat*OR***
  Description: MCMC integrator for evaluating multidimensional integration based on dynamical nested sampling.
  Role: Main developer and maintainer
  Project Page: Non-disclose.

Scientific Activities & Services

Workshop organization

- Organizer of the Mini-workshop on Novel Experimental and Astrophysical Probes for Dark Matter, Taipei, Taiwan, 2021

Journal referee

1. Physical Letter B
2. Annals of Physics