

# YANG MA

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🌐 <https://yangphy.github.io>

## PROFESSIONAL PREPARATION

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### Ph.D. in Physics

University of Pittsburgh, PA, U.S.A.

August 2022

Advisor: Tao Han

### M.S. in Physics

Chongqing University, Chongqing, China

June 2016

## SKILLS

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**Programming Language:** C/C++, Fortran, Python, Shell script

**Handy Programs:** Mathematica, Matlab, L<sup>A</sup>T<sub>E</sub>X, Excel, Powerpoint, Linux (OS)

**HEP Packages:** MADGRAPH, Pythia, FeynRules, FeynArts, FeynCalc, FormCalc, WHIZARD, ManeParse

## POSITION HELD

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### Postdoctoral Researcher

INFN Bologna, Italy

September 2022 - present

### Graduate Teaching Fellow

Dept. Physics & Astronomy, University of Pittsburgh

May 2022 - July 2022

### Graduate Research Fellow

Dept. Physics & Astronomy, University of Pittsburgh

January 2022 - April 2022

### Arts & Sciences Pre-Doctoral Fellow

Kenneth P. Dietrich School of Arts & Sciences, University of Pittsburgh

September 2020 - December 2021

### Graduate Research Assistant

Dept. Physics & Astronomy, University of Pittsburgh

January 2020 - August 2020

### Graduate Teaching Assistant

Dept. Physics & Astronomy, University of Pittsburgh

September 2016 - January 2020

## AWARDS AND HONORS

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### Outstanding Reviewer Awards 2022

Journal of Physics Communications, IOP Publishing

March 2023

### DPF Student Travel Award

APS Division of Particles and Fields (DPF)

April 2022

### Thomas-Lain Scholarship

Dept. Physics & Astronomy, University of Pittsburgh

April 2021

### FGSA Award for Excellence in Graduate Research

American Physical Society (APS)

February 2021

### Arts & Sciences Graduate Fellowship

Kenneth P. Dietrich School of Arts & Sciences, University of Pittsburgh

September 2020

### Pitt Physics and Astronomy China Initiative (PACI) Scholarship

Dept. Physics & Astronomy, University of Pittsburgh

September 2016

## MEMBERSHIP IN PROFESSIONAL SOCIETIES

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American Physical Society (APS) member	March 2021 - present
International Organization of Chinese Physics & Astrophysics member	September 2021 - present
American Association for the Advancement of Science (AAAS) member	September 2021 - present

## PUBLICATIONS IN REFEREED JOURNALS

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1. C. Accettura et al., *Towards a muon collider*, *Eur. Phys. J. C* **83** (2023) 864 [2303.08533].
2. T. Han, A. K. Leibovich, Y. Ma and X.-Z. Tan, *Higgs boson decay to charmonia via c-quark fragmentation*, *JHEP* **08** (2022) 073 [2202.08273].
3. T. Han, W. Kilian, N. Kreher, Y. Ma, J. Reuter, T. Striegl et al., *Precision Test of the Muon-Higgs Coupling at a High-energy Muon Collider*, *JHEP* **12** (2021) 162 [2108.05362].
4. D. Buarque et al., *Vector Boson Scattering Processes: Status and Prospects*, *Rev. Phys.* **8** (2022) 100071 [2106.01393].
5. T. Han, Y. Ma and K. Xie, *Quark and gluon contents of a lepton at high energies*, *JHEP* **02** (2022) 154 [2103.09844].
6. T. Han, Y. Ma and K. Xie, *High energy leptonic collisions and electroweak parton distribution functions*, *Phys. Rev. D* **103** (2021) L031301 [2007.14300].
7. Z. Sun and Y. Ma, *Inclusive productions of  $\Upsilon(1S, 2S, 3S)$  and  $\chi_b(1P, 2P, 3P)$  via the Higgs boson decay*, *Phys. Rev. D* **100** (2019) 094019 [1909.08548].
8. Z. Sun, X.-G. Wu, Y. Ma and S. J. Brodsky, *Exclusive production of  $J/\psi + \eta_c$  at the B factories Belle and Babar using the principle of maximum conformality*, *Phys. Rev. D* **98** (2018) 094001 [1807.04503].
9. Y. Ma and X.-G. Wu, *Renormalization scheme dependence of high-order perturbative QCD predictions*, *Phys. Rev. D* **97** (2018) 036024 [1707.09886].
10. J.-M. Shen, X.-G. Wu, Y. Ma and S. J. Brodsky, *The Generalized Scheme-Independent Crewther Relation in QCD*, *Phys. Lett. B* **770** (2017) 494 [1611.07249].
11. H.-Y. Bi, X.-G. Wu, Y. Ma, H.-H. Ma, S. J. Brodsky and M. Mojaza, *Degeneracy Relations in QCD and the Equivalence of Two Systematic All-Orders Methods for Setting the Renormalization Scale*, *Phys. Lett. B* **748** (2015) 13 [1505.04958].
12. H.-H. Ma, X.-G. Wu, Y. Ma, S. J. Brodsky and M. Mojaza, *Setting the renormalization scale in perturbative QCD: Comparisons of the principle of maximum conformality with the sequential extended Brodsky-Lepage-Mackenzie approach*, *Phys. Rev. D* **91** (2015) 094028 [1504.01260].
13. Y. Ma, X.-G. Wu, H.-H. Ma and H.-Y. Han, *General Properties on Applying the Principle of Minimum Sensitivity to High-order Perturbative QCD Predictions*, *Phys. Rev. D* **91** (2015) 034006 [1412.8514].
14. H.-B. Fu, X.-G. Wu and Y. Ma,  *$B \rightarrow K^*$  Transition Form Factors and the Semi-leptonic Decay  $B \rightarrow K^* \mu^+ \mu^-$* , *J. Phys. G* **43** (2016) 015002 [1411.6423].
15. H.-B. Fu, X.-G. Wu, H.-Y. Han, Y. Ma and H.-Y. Bi, *The  $\rho$ -meson longitudinal leading-twist distribution amplitude*, *Phys. Lett. B* **738** (2014) 228 [1409.3053].
16. G. Chen, X.-G. Wu, Z. Sun, Y. Ma and H.-B. Fu, *Photoproduction of doubly heavy baryon at the ILC*, *JHEP* **12** (2014) 018 [1408.4615].

17. H.-B. Fu, X.-G. Wu, H.-Y. Han and Y. Ma,  $B \rightarrow \rho$  transition form factors and the  $\rho$ -meson transverse leading-twist distribution amplitude, *J. Phys. G* **42** (2015) 055002 [[1406.3892](#)].
18. X.-G. Wu, Y. Ma, S.-Q. Wang, H.-B. Fu, H.-H. Ma, S. J. Brodsky et al., Renormalization Group Invariance and Optimal QCD Renormalization Scale-Setting, *Rept. Prog. Phys.* **78** (2015) 126201 [[1405.3196](#)].
19. S.-Q. Wang, X.-G. Wu, J.-M. Shen, H.-Y. Han and Y. Ma, QCD improved electroweak parameter  $\rho$ , *Phys. Rev. D* **89** (2014) 116001 [[1402.0975](#)].
20. Z. Sun, X.-G. Wu, G. Chen, Y. Ma, H.-H. Ma and H.-Y. Bi, Bottomonium production associated with a photon at a high luminosity  $e^+e^-$  collider with the one-loop QCD correction, *Phys. Rev. D* **89** (2014) 074035 [[1401.2735](#)].
21. H.-B. Fu, X.-G. Wu, H.-Y. Han, Y. Ma and T. Zhong,  $|V_{cb}|$  from the semileptonic decay  $B \rightarrow D\ell\bar{\nu}_\ell$  and the properties of the  $D$  meson distribution amplitude, *Nucl. Phys. B* **884** (2014) 172 [[1309.5723](#)].

## OTHER PUBLICATIONS

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1. J. Reuter, T. Han, W. Kilian, N. Kreher, Y. Ma, T. Striegl et al., Precision test of the muon-Higgs coupling at a high-energy muon collider, *PoS ICHEP2022* (2022) 1239 [[2212.01323](#)].
2. T. Han, A. K. Leibovich, Y. Ma and X.-Z. Tan, Higgs decay to charmonia and the charm-quark Yukawa coupling, *PoS ICHEP2022* (2022) 517 [[2211.10727](#)].
3. K. M. Black et al., Muon Collider Forum Report, [2209.01318](#).
4. T. Han, Y. Ma and K. Xie, Electroweak fragmentation at high energies: A Snowmass White Paper, in *2022 Snowmass Summer Study*, 3, 2022, [2203.11129](#).
5. J. M. Campbell et al., Event Generators for High-Energy Physics Experiments, in *2022 Snowmass Summer Study*, 3, 2022, [2203.11110](#).
6. I. Adachi et al., The International Linear Collider: Report to Snowmass 2021, in *2022 Snowmass Summer Study*, 3, 2022, [2203.07622](#).
7. J. De Blas et al., The physics case of a 3 TeV muon collider stage, in *2022 Snowmass Summer Study*, 3, 2022, [2203.07261](#).
8. C. Aimè et al., Muon Collider Physics Summary, in *2022 Snowmass Summer Study*, 3, 2022, [2203.07256](#).

## SEMINARS AND COLLOQUIUM

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|---|----------|
| 1. Bread and butter physics at future multi-TeV lepton colliders<br>NHETC Theory Seminar, Rutgers University        | May 2023 |
| 2. Measuring the Yukawa couplings: Towards the 2nd generation fermions<br>HEP Lunch Seminar, University of Chicago  | May 2023 |
| 3. Electroweak Tevatron: High-Energy lepton colliders<br>Theoretical Physics Seminar, Fermilab                      | May 2023 |
| 4. Bread and butter physics at future multi-TeV lepton colliders<br>LEPP Theory Seminar, Cornell University         | May 2023 |
| 5. Measuring the Yukawa couplings: Towards the 2nd generation fermions<br>HEP Theory Seminar, University at Buffalo | May 2023 |

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| 6. <i>Determine the Yukawa couplings of the second generation fermions at high-energy colliders</i><br>(Remote) HEP Theory Seminar, Argonne National Laboratory (ANL)          | January 2023   |
| 7. <i>Determine the Yukawa couplings of the second generation fermions at high-energy colliders</i><br>(Remote) TDLI/INPAC Joint Theory Seminar, Shanghai Jiao Tong University | December 2022  |
| 8. <i>Determine the Yukawa couplings of the second generation fermions at high-energy colliders</i><br>(Remote) Particle Physics Seminar, Chongqing University                 | December 2022  |
| 9. <i>Determine the Yukawa couplings of the second generation fermions at high-energy colliders</i><br>(Remote) Theoretical Physics Seminar, Shandong University               | December 2022  |
| 10. <i>Phenomenology at high-energy colliders</i><br>Bologna HEP Theory Journal Club, INFN Bologna & University of Bologna   | November 2022  |
| 11. <i>The partonic picture and the SM expectation of high-energy lepton colliders</i><br>HEP Seminar, University of Notre Dame  | September 2022 |
| 12. <i>The partonic picture and the SM expectation of high-energy lepton colliders</i><br>HEP Seminar, University of Wisconsin-Madison   | September 2022 |
| 13. <i>The partonic picture and the SM expectation of high-energy lepton colliders</i><br>HEP Special Seminar, University of Michigan  | September 2022 |
| 14. <i>The partonic picture and the SM expectation of high-energy lepton colliders</i><br>HEP Seminar, Northwestern University   | September 2022 |
| 15. <i>Higgs decay to charmonia and the charm-quark Yukawa coupling</i><br>HEP Seminar, Michigan State University  | September 2022 |
| 16. <i>Higgs decay to charmonia and the charm-quark Yukawa coupling</i><br>HEP Seminar, Washington University in St. Louis   | September 2022 |
| 17. <i>The partonic picture and the SM expectation of high-energy lepton colliders</i><br>HEP Seminar, University of Minnesota   | August 2022    |
| 18. <i>Higgs decay to <math>J/\psi</math> via <math>c</math>-quark fragmentation</i><br>(Remote) Nuclear Physics Seminar, UCLA   | May 2022       |
| 19. <i>Higgs decay to charmonia and the charm quark Yukawa</i><br>PITT PACC Group Seminar, University of Pittsburgh  | March 2022     |
| 20. <i>Multi-boson production and the muon Yukawa coupling</i><br>(Remote) HEP Journal Club, University of Utah  | October 2021   |
| 21. <i>Multi-boson production and the muon Yukawa coupling</i><br>PITT PACC Group Seminar, University of Pittsburgh  | September 2021 |
| 22. <i>Parton contents of a lepton at high energies</i><br>(Remote) Particle Theory Seminar, Carleton University   | May 2021       |
| 23. <i>The partonic picture at high-energy lepton colliders</i><br>(Remote) SLAC EPP Theory Seminar, SLAC  | April 2021     |
| 24. <i>The partonic picture at high-energy lepton colliders</i><br>(Remote) Particle Theory Seminar, Shandong University   | April 2021     |

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| 25. <i>Parton contents of a lepton at high energies</i><br>(Remote) HEP Seminar, Oklahoma State University                                  | April 2021     |
| 26. <i>QCD jet production at high energy lepton colliders</i><br>(Remote) PITT PACC Group Seminar, University of Pittsburgh                 | March 2021     |
| 27. <i>High energy lepton collisions and electroweak PDFs</i><br>(Remote) Particle Theory Seminar, Carleton University                      | October 2020   |
| 28. <i>High energy lepton collisions and electroweak PDFs</i><br>(Remote) PITT PACC Group Seminar, University of Pittsburgh                 | September 2020 |
| 29. <i>How much do we need polarized PDFs?</i><br>PITT PACC Group Seminar, University of Pittsburgh   | October 2019   |
| 30. <i>Renormalization scheme uncertainties in high order perturbative QCD results</i><br>PITT PACC Group Seminar, University of Pittsburgh | March 2019     |

## CONFERENCE AND WORKSHOP TALKS

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| 1. <i>Muon colliders and Weak PDFs</i><br>MADGRAPH5_aMC@NLO meeting 2023, Gargnano, Lake Garda, Italy   | September 2023 |
| 2. <i>Muon Yukawa couplings at the high-energy muon collider</i><br>Parallel talk at Pheno 2023, University of Pittsburgh                                   | May 2023       |
| 3. <i>Electroweak LHC: High-energy lepton colliders</i><br>Invited talk at PIKIMO Spring 2023, Ohio State University  | April 2023     |
| 4. <i>EW and QCD physics at the muon collider</i><br>Parallel talk at Milan Christmas Meeting 2022, Milan, Italy  | December 2022  |
| 5. <i>Higgs decay to charmonia and the charm-quark Yukawa coupling</i><br>Parallel talk at the Higgs 2022 Conference, Pisa, Italy                           | November 2022  |
| 6. <i>EW and QCD physics at the muon collider</i><br>Parallel talk at Muon Collider Collaboration Meeting 2022, CERN  | October 2022   |
| 7. <i>Higgs decay to charmonia via c-quark fragmentation</i><br>Invited plenary talk at QWG 2022, GSI Darmstadt, Germany                                    | September 2022 |
| 8. <i>Higgs decay to charmonia and the charm-quark Yukawa coupling</i><br>(Remote) Invited talk at the SYSU-PKU Collider Physics forum For Young Scientists | September 2022 |
| 9. <i>Higgs decay to <math>J/\psi</math> via c-quark fragmentation</i><br>(Remote) Parallel talk at ICHEP 2022, Bologna, Italy                              | July 2022      |
| 10. <i>Higgs decay to <math>J/\psi</math> via c-quark fragmentation</i><br>Parallel talk at Pheno 2022, University of Pittsburgh                            | May 2022       |
| 11. <i>Multi-boson production and the muon Yukawa coupling</i><br>Contributed talk at APS April Meeting 2022, New York                                      | April 2022     |
| 12. <i>Multi-boson production and the muon Yukawa coupling</i><br>PIKIMO 11, University of Pittsburgh   | December 2021  |
| 13. <i>Electroweak parton distributions and fragmentations for high-energy lepton colliders</i><br>(Remote) Snowmass EF04 Topical Group Community Meeting   | October 2021   |

14. <i>Higgs boson decay to <math>J/\psi</math> via <math>c</math>-quark fragmentation</i> (Remote) Parallel talk at Higgs 2021 Conference, Stony Brook University	October 2021
15. <i>The partonic picture at high-energy lepton colliders</i> (Remote) Parallel talk at SUSY 2021, Shanghai	August 2021
16. <i>QCD jet production at a high energy muon collider</i> (Remote) Parallel talk at EPS-HEP 2021, DESY	July 2021
17. <i>Quark and gluon contents of a lepton at high energies</i> (Remote) Parallel talk at the DPF meeting, Florida State University	July 2021
18. <i>Quark and gluon contents of a lepton at high energies</i> (Remote) Parallel talk at Pheno 2021, University of Pittsburgh	May 2021
19. <i>The partonic picture at high-energy lepton colliders</i> (Remote) Parallel talk at PPC 2021, University of Oklahoma	May 2021
20. <i>Electroweak parton distribution functions at a high-energy muon collider</i> (Remote) Contributed talk at APS April Meeting 2021	April 2021
21. <i>QCD jet production at a high energy muon collider</i> (Remote) Talk at Muon Collider Physics and Simulation Meeting, CERN	March 2021
22. <i>The electroweak parton distribution functions - Necessity and application</i> (Remote) Student talk at Theoretical Advanced Study Institute (TASI 2020)	June 2020
23. <i>The electroweak parton distribution functions</i> (Remote) Parallel talk at Pheno 2020, University of Pittsburgh	May 2020
24. <i>QCD Scale-setting problem in Future Chinese Collider physics</i> Parallel talk at CEPC-SppC Study Group Meeting, IHEP, Beijing	September 2015

## CONFERENCES AND WORKSHOPS ATTENDED

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1. MADGRAPH5_aMC@NLO meeting 2023, Gargnano, Lake Garda, Italy	September 2023
2. Muon Collider Collaboration Meeting 2023, IJCLab in Orsay, France	May 2023
3. Phenomenology Symposium 2023 (Pheno 2023), University of Pittsburgh	May 2023
4. PIKIMO Spring 2023, Ohio State University	April 2023
5. Milan Christmas Meeting 2022, Milan, Italy	December 2022
6. Higgs 2022, Pisa, Italy	November 2022
7. Muon Collider Collaboration Meeting 2022, CERN	October 2022
8. The 15th International Workshop on Heavy Quarkonium (QWG 2022) GSI Darmstadt, Germany	September 2022
9. SYSU-PKU Collider Physics forum For Young Scientists (remote)	September 2022
10. Snowmass Community Summer Study Workshop (Snowmass 2022), Seattle	July 2022
11. XLI International Conference on High Energy Physics (ICHEP 2022), Bologna, Italy	July 2022
12. LoopFest XX, University of Pittsburgh	May 2022
13. Phenomenology Symposium 2022 (Pheno 2022), University of Pittsburgh	May 2022
14. APS April Meeting 2022, New York	April 2022

15. PIKIMO 11, University of Pittsburgh (hybrid)	December 2021
16. Higgs 2021 Stony Brook University & Brookhaven National Laboratory (remote)	October 2021
17. The XXVIII International Conference on Supersymmetry and Unification of Fundamental Interactions (SUSY 2021), Shanghai (remote)	August 2021
18. European Physical Society Conference on High Energy Physics 2021 (EPS-HEP 2021) DESY (remote)	July 2021
19. 2021 Meeting of the Division of Particles and Fields of the APS (DPF21) Florida State University (remote)	July 2021
20. Phenomenology Symposium 2021 (Pheno 2021), University of Pittsburgh	May 2021 (remote)
21. XIV International Workshop on Interconnections between Particle Physics and Cosmology (PPC 2021), University of Oklahoma (remote)	May 2021
22. APS April Meeting 2021 (remote)	April 2021
23. Muon Collider Physics and Simulation Meeting (remote)	March 2021
24. PITT PACC Workshop: Muon collider physics University of Pittsburgh (remote)	November 2020
25. Phenomenology Symposium 2020 (Pheno 2020) University of Pittsburgh (remote)	May 2020
26. Phenomenology Symposium 2020 (Pheno 2019), University of Pittsburgh	May 2019
27. PITT PACC Workshop: BSM circa 2020, University of Pittsburgh	March 2019
28. Phenomenology Symposium 2020 (Pheno 2018), University of Pittsburgh	May 2018
29. Phenomenology Symposium 2020 (Pheno 2017), University of Pittsburgh	May 2017
30. The CEPC-SppC Study Group Meeting Institute of High Energy Physics (IHEP), Beijing	September 2015

## SUMMER SCHOOLS ATTENDED

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1. <b>CTEQ 2022</b> , University of Pittsburgh <i>CTEQ School on QCD and Electroweak Phenomenology</i>	July 2022
2. <b>SSI 2021</b> , SLAC <i>49th SLAC SUMMER INSTITUTE: The Higgs State Fair</i>	August 2021
3. <b>HCPSS 2020</b> , Fermilab <i>15th annual Fermilab-CERN Hadron Collider Physics Summer School</i>	August 2020
4. <b>TASI 2020</b> , University of Colorado Boulder <i>The Obscure Universe: Neutrinos and Other Dark Matters</i>	June 2020
5. <b>CTEQ 2019</b> , University of Pittsburgh <i>CTEQ School on QCD and Electroweak Phenomenology</i>	July 2019
6. <b>CTEQ 2017</b> , University of Pittsburgh <i>CTEQ School on QCD and Electroweak Phenomenology</i>	July 2017

## REFeree SERVICE

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- Chinese Physics C (CPC)  $\times 1$
- Physical Review D (Phys. Rev. D)  $\times 1$
- The European Physical Journal C (Eur. Phys. J. C)  $\times 1$
- Journal of Physics Communications (J. Phys. Commun.)  $\times 1$

## TEACHING EXPERIENCE

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### Graduate Teaching Fellow (instructor) at the University of Pittsburgh

- PHYS 0174 - *Basic Physics, Science and Engineering 1*, Summer 2022  
Covers Mechanics and Wave

### Graduate Teaching Assistant at the University of Pittsburgh

- PHYS 0219 - *Basic Laboratory Physics for Science and Engineering*  
Fall 2016, Spring 2017, and Fall 2018
- PHYS 0212 - *Introduction to Laboratory Physics*  
Fall 2017, Spring 2018, and Summer 2018
- PHYS 0110 - *Introduction to Physics 1*, Summer 2018  
Covers Mechanics, Heat and Thermodynamics, and Waves
- PHYS 0111 - *Introduction to Physics 2*, Summer 2017  
Covers Thermodynamics, Electromagnetism, Optics, Special Relativity, and Quantum Physics
- PHYS 0175 - *Basic Physics, Science and Engineering 2*, Spring 2019 and Summer 2021  
Covers Electromagnetism, Elementary Quantum Mechanics, and Atomic Structure

### Graduate Teaching Assistant at Chongqing University

- College Physics I - *Classical Mechanics and Electromagnetism*, Spring 2014
- College Physics II - *Thermodynamics, Optics and Special Relativity*, Fall 2013

## MENTORING EXPERIENCE

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- Dept. Physics & Astronomy Graduate Student Mentor August 2021 - May 2022  
Mentor three first year graduate students
- Assist to guide one visiting graduate student (*Xiaoze Tan*) December 2019 - December 2020  
(*JHEP* **08** (2022) 073 [[2202.08273](#)])
- Assist to guide one visiting undergraduate student June 2019 - August 2019