

Kuo-Chuan Pan (潘國全)

Department of Physic and Institute of Astronomy
National Tsing Hua University
101 Section 2 Kuang Fu Road,
Hsinchu, 30013, Taiwan

Email: [kuochuan.pan\[at\]gapp.nthu.edu.tw](mailto:kuochuan.pan[at]gapp.nthu.edu.tw)
Web: <http://kuochuanpan.github.io>
Phone: +886-3-5742563

Experience

- 08/2022 – present **Associate Professor**
National Tsing Hua University, Hsinchu, Taiwan
- 08/2018 – 07/2022 **Assistant Professor**
National Tsing Hua University, Hsinchu, Taiwan
- 11/2016 – 06/2018 **Postdoctoral Scholar**
Michigan State University, East Lansing, Michigan, USA
Core-collapse supernova mechanism
with Sean Couch
- 08/2013 – 10/2016 **Postdoctoral Scholar**
Universität Basel, Basel, Switzerland
Core-collapse supernova mechanism
with Friedrich-Karl Thielemann

Education

- 2007 – 2013 **University of Illinois at Urbana-Champaign, Illinois, USA**
Ph.D. in astronomy with computational science and engineering (CSE) option
Dissertation Advisor: Paul Ricker
Dissertation Title: *The fates of binary companions in type Ia supernovae within the single-degenerate scenario*
- 2000 – 2004 **National Tsing Hua University, Hsinchu, Taiwan**
B.Sc. in Physics

Honor & Awards

- 2022 NTHU 25th New Faculty Research Award (清華大學新進人員研究獎)
- 2021 NCHC science highlight and interviewed by DIGITIMES
- 2018-2020 MOST early career research award (科技部延攬特殊優秀人才)
- 2016 Visualization image on the cover photo on the Innovative and Novel Computational Impact on Theory and Experiment (INCITE) program press release (PI: Sean Couch), USA
- 2016 Bronze prize poster award in the NIC 2016 international conference, Niigata, Japan
- 2010 – 2012 Computational Science and Engineering Fellowships, Urbana, Illinois, USA

Department Services

- 111 College Assembly Committee, NTHU
Student affairs and mentor Committee, Department of Physics, NTHU

110	Instructor, "Talent high school student education program (高培計畫)" Convener, Admission Committee, Department of Physics, NTHU IT Committee, Department of Physics, NTHU
109	Instructor, "Talent high school student education program (高培計畫)" Convener, Admission Committee, Department of Physics, NTHU Scholarship Committee (college level), NTHU IT Committee, Department of Physics, NTHU
108	Instructor, "Talent high school student education program (高培計畫)" Admission Committee, Department of Physics, NTHU IT Committee, Department of Physics, NTHU
107	Instructor, "Talent high school student education program (高培計畫)" College Assembly Committee, NTHU Admission Committee, Department of Physics, NTHU Admission Committee, Department of Physics, NTHU

Activities & Services

2021/01 –	Core-member, Theoretical and Computational Astrophysics Thematic Group, NCTS Physics division, Taipei
2019/09/04–06	Organizer of the "Numerical Astrophysics Summer School: Astrophysical Fluid Dynamics", NTHU, Taiwan
2018/09/29	Organizer of "FLASH Boot camp", NTHU, Taiwan
2015 –	Referee of the Computational Astrophysics and Cosmology (ComAC)
2014 –	Referee of the Nature Journal (Natur)
2013 –	Referee of the Astrophysical Journal (ApJ)
2004 – 2005	Military service (2 nd Lieutenant in Army)
2003	President of astronomy club, National Tsing Hua University, Taiwan
2002	Advisor of astronomy club, National Hsinchu Girl's Senior High School, Taiwan

Professional Associations

2022 –	Einstein Telescope (ET) member
2021 –	LIGO member
2020 –	KAGRA EPO member
2019 –	Physics Society of Taiwan
2019 –	KAGRA KSC member
2018 –	KAGRA collaborator
2018 –	Astronomical Society of Taiwan
2018 –	International Astronomical Union
2010 – 2013	American Astronomical Society

Grants or Computing Allocations

- 08/2022 - 07/2023 **MOST Grants**
 尋找核心坍縮超新星之重力波訊號(2/3)
Searches for gravitational wave emissions from core-collapse supernovae (2/3)
 \$ 1.03M NTD (~ 33,000 USD)
 PI: Kuo-Chuan Pan
- 08/2021 - 07/2022 **MOST EPO Grants**
The Ripple of the Universe (MST 110-2515-S-007 -004)
 \$ 725K NTD (~ 25K USD)
 Co-I: Kuo-Chuan Pan (PI: Albert Kong)
- 08/2021 - 07/2022 **MOST Grants**
 尋找核心坍縮超新星之重力波訊號(1/3)
Searches for gravitational wave emissions from core-collapse supernovae (1/3)
 \$ 1.03M NTD (~ 33,000 USD)
 PI: Kuo-Chuan Pan
- 06/2021 - 08/2021 **NCHC Taiwania 3 computing allocations**
Unlimited cpu-hours (MST107473)
 PI: Kuo-Chuan Pan
- 04/2021 - 06/2021 **Invited for NCHC Taiwania 3 closed beta test**
Unlimited cpu-hours (GOV109199, MST107473)
 Member: Kuo-Chuan Pan
- 01/2020- 12/2021 **NCTS seed program**
Multimessenger Astrophysics
 \$ 250,000 NTD (~ 7,700 USD) per year
 PI: Kuo-Chuan Pan (with co-PIs at ASIOP, ASIAA, and NTU)
- 09/2019 - 10/2020 **MOST Grants for supporting postdoc**
 超新星爆發之多信使訊號 - 多維度天文流體模擬
Multimessenger Signals from Supernovae via Multidimensional Hydrodynamics Simulations
 \$ 1.00586M NTD (~ 33,000 USD)
 PI: Kuo-Chuan Pan
- 08/2019 - 07/2022 **MOST Grants**
 圖形顯卡加速和自適性網格於天文前沿電腦模擬之應用
 \$ 5.461M NTD (~ 182,000 USD)
 Co-I, PI: Hsi-Yu Schive (NTU)
- 09/2019 **PRPC special grants for organizing a small workshop**
 \$ 60,000 NTD (~ 2,000 USD)
 PI: Kuo-Chuan Pan (with co-PIs at ASIOP, ASIAA, and NTU)
- 01/2019- 12/2020 **NCTS seed program**
Multimessenger Astrophysics
 \$ 150,000 NTD (~ 5,000 USD) per year
 PI: Kuo-Chuan Pan (with co-PIs at ASIOP, ASIAA, and NTU)
- 10/2018 - 07/2021 **MOST Grants**
 超新星爆發之多信使訊號 - 多維度天文流體模擬
Multimessenger Signals from Supernovae via Multidimensional Hydrodynamics Simulations
 \$ 4.377M NTD (~ 146,000 USD)
 PI: Kuo-Chuan Pan
- 2018 **Piz-Daint Computing Allocation**
Gravitational Wave and Neutrino Signals from Core-Collapse Supernovae and Failed Supernovae
 200,000 node-hours (2018.04-2019.03) on the Cray XC50 - Hybrid, Piz Daint
 PI: Kuo-Chuan Pan
- 2018 **2018 ALCF INCITE Award**
Extreme-scale Simulation of Supernovae and Magnetars from Realistic Progenitors

- 150,000,000 Mira (IBM Blue Gene/Q) core-hours
29,250,000 Mira-equivalent core-hours on Theta (Cray XC40)
Co-I, PI: Sean Couch
- 2016 – 2018 **Piz-Daint Computing Allocations**
The isotropic diffusion source approximation for the simulation of faint and faded supernova explosions with additional degrees of freedom in the equation of state
750,000 node-hours (2016.04 - 2017.03) on the CrayXC30, Piz Daint
750,000 node-hours (2017.04 - 2018.03) on the CrayXC50 - Hybrid, Piz Daint
Co-I, PI: Matthias Liebendörfer
- 2013 **Hubble Cycle 21**
A search for surviving companions of type Ia supernova in the Large Magellanic Cloud
Co-I, PI: You-Hua Chu
- 2010 – 2012 **Computational Science and Engineering Fellowship**
Impact of Type Ia Supernova Ejecta on Companion Star and Subsequent Evolution of Remnant
~ \$23,000 per year
PI: Kuo-Chuan Pan

Grants, Awards or Fellowships as Advisor

- 01/2022 **Best oral presentation award, 2022 TPS meeting**
2022物理年會口頭發表論文獎
Shiau-Jie Rau
- 01/2022 **Best poster award, 2022 TPS meeting**
2022物理年會壁報論文優勝
Li-Ting Ma
- 01/2022 **Selected top poster award, 2022 TPS meeting**
2022物理年會壁報論文佳作
Li-Ting Ma
- 07/2021 - 02/2022 **MOST undergraduate research project**
科技部大專學生研究計畫
Hao-Sheng Wang
- 12/2020 **Best student poster award, Department of Physics, NTHU**
物理系壁報論文獎
Shiau-Jie Rau
- 12/2020 **Best student poster award, Department of Physics, NTHU**
物理系壁報論文獎
Hao-Sheng Wang

Recent Talks

- 09/2022 *Exploring the core-collapse supernova engine and multi-messenger signals from high-resolution 3D simulations*
The 9th East Asian Numerical Astrophysics Meeting (EANAM9), Okinawa, Japan
- 08/2022 *Exploring the core-collapse supernova engine and multi-messenger signals from high-resolution 3D simulations*
The 15th Asia Pacific Physics Conference (APPC15), Seoul, Korea
- 04/2022 *Handbook for Supernovae*
Public science talk, National Tsing Hua University, Hsinchu, Taiwan
- 04/2022 *Exploring the core-collapse supernova engine and multi-messenger signals from high-resolution three-dimensional simulations*

- Promotion talk, Institute of Astronomy, National Tsing Hua University, Hsinchu, Taiwan
- 04/2022 *Exploring the core-collapse supernova engine and multi-messenger signals from high-resolution three-dimensional simulations*
High Energy Physics seminar, Academia Sinica Institute of Physics, Nankang, Taipei 11529, Taiwan
- 03/2022 *Exploring the core-collapse supernova engine and multi-messenger signals from high-resolution three-dimensional simulations*
Fundamental Physics Group seminar, National Central University, Taoyuan City, Taiwan
- 12/2021 *Hearing the Sounds of Gravitational Waves from Supernovae*
NCTA Annual Theory Meeting, NCTS physics division, Taipei, Taiwan
- 10/2021 *Hearing the Sounds of Gravitational Waves from Supernovae*
Colloquium, Department of Physics, National Changhua University of Education, Changhua, Taiwan
- 10/2021 *Hearing the Sounds of Gravitational Waves from Supernovae*
Colloquium, Institute of Physics, National Yang Ming Chiao Tung University, Hsinchu, Taiwan
- 09/2021 *Gravitational Wave Emissions from 3D Core-Collapse Supernova Simulations*
LIGO-Virgo-KAGRA collaboration meeting, Supernova Group, via zoom.
- 07/2021 *Lecture on Radiative Process, 2021 NCTS-TCA Summer Student Program, National Center for Theoretical Sciences, Taipei, Taiwan*
- 03/2021 *Core-Collapse Supernovae: A journey from stellar explosion to neutron star/black hole formation*
Physics colloquium, National Tsing Hua University, Hsinchu, Taiwan
- 12/2020 *Stellar Mass Black Hole Formation and Multimessenger Signals from Three Dimensional Rotating Core-Collapse Supernova Simulations*
The 7th KAGRA international workshop (KIW), National Central University, Taoyuan City, Taiwan
- 12/2020 † *Stellar Mass Black Hole Formation and Multimessenger Signals from Three Dimensional Rotating Core-Collapse Supernova Simulations*
NCTS Annual Theory Meeting 2020, National Center for Theoretical Sciences, Hsinchu, Taiwan
- 11/2020 *Stellar Mass Black Hole Formation and Multimessenger Signals from Core-Collapse Supernovae*
Colloquium, Academia Sinica Institute of Astronomy and Astrophysics, Taipei, Taiwan
- 11/2020 *Stellar Mass Black Hole Formation and Multimessenger Signals from Core-Collapse Supernovae*
High Energy Physics seminar, National Center for Theoretical Sciences, Hsinchu, Taiwan
- 11/2020 *Hearing the Gravitational Waves from Supernovae*
Colloquium, Institute of Space and Plasma Sciences, National Cheng Kung University, Tainan, Taiwan
- 10/2020 † *Stellar Mass Black Hole Formation and Multimessenger Signals from Three Dimensional Rotating Core-Collapse Supernova Simulations*
LIGO-Virgo Burst-Supernova Call via zoom
- 06/2020 *Hearing the Gravitational Waves from Supernovae*
Physics colloquium, Dnghai University, Taichung City, Taiwan
- 02/2020 *Multi-messenger Signals from Core-Collapse Supernovae*

†invited conference/workshop talk

- 2020 Annual Meeting of the Physical Society of Taiwan (TPS2020), National Pingtung University, Pingtung City, Taiwan
- 12/2019 *Multi-messenger Signals from Core-Collapse Supernovae*
NCTS Annual Theory Meeting 2019, National Center for Theoretical Sciences, Hsinchu, Taiwan
- 10/2019 *Stellar Explosions: Multi-messenger Signals from Core-Collapse Supernovae*
Physics frontier seminar, National Tsing Hua University, Hsinchu, Taiwan
- 09/2019 Lectures on computational astrophysics and FLASH tutorial, Numerical Astrophysics Summer School: Astrophysical Fluid Dynamics, National Center for Theoretical Sciences, Hsinchu, Taiwan
- 06/2019 *GPU-Accelerated Neutrino Transport Solver for Multi-Dimensional Core-Collapse Supernova Simulations*
the sixth Platform for Advanced Scientific Computing Conference (PASC19), Zürich, Switzerland
- 05/2019 *Multimessenger signals from core-collapse supernova*
Annual meeting of Taiwan Astronomy Society, National Museum of Natural Science, Taichung, Taiwan
- 05/2019 *Multimessenger signals from core-collapse supernova*
Astronomy colloquium, National Central University, Taoyuan City, Taiwan
- 04/2019 *Multimessenger signals from core-collapse supernova*
High Energy Physics seminar, National Chiao Tung University, Hsinchu, Taiwan
- 04/2019 *Core-collapse supernova and its Multimessenger signals*
Astronomy club, National Tsing Hua University, Hsinchu, Taiwan
- 04/2019 *Core-collapse supernova and its Multimessenger signals*
iPhD seminar, National Tsing Hua University, Hsinchu, Taiwan
- 04/2019 *Multimessenger signals from core-collapse supernova*
Mini-workshop on massive stars, core-collapse supernovae, and nucleosynthesis, Institute of Physics, Academia Sinica, Taipei, Taiwan
- 02/2019 *Multimessenger signals from core-collapse supernova*
Supernova workshop@CUHK, Chinese University of Hong Kong, Hong Kong
- 12/2018 *Core-collapse supernovae: explosion, neutron star, black hole, and multimessenger signals*
Physics colloquium, National Sun Yat-sen University, Kaohsiung, Taiwan
- 12/2018 *Multimessenger signals from core-collapse supernova simulations*
Contributed talk, The 21st KAGRA face-to-face meeting, Satellite meeting on Data Analysis, ICRR, the University of Tokyo, Japan
- 11/2018 *Multimessenger signals from stellar mass black hole formation*
Contributed talk, Taiwan-Glasgow Gravitational Wave Workshop, Glasgow, United Kingdom
- 10/2018 *Search for Surviving companions in Type Ia supernova remnants*
Ron's Fest: A celebration for Ron Taam's 70th birthday
- 10/2018 *Multimessenger signals from stellar mass black hole formation*
Contributed talk, East Asian Numerical Astrophysics Meeting, National Cheng-Kung University, Tainan, Taiwan
- 10/2018 [†] *Multimessenger signals from stellar mass black hole formation*
Invited talk, Deciphering multi-Dimensional nature of core-collapse SuperNovae via Gravitational-Wave and neutrino signatures (SNeGWv2018), Toyama, Japan
- 10/2018 *Core-collapse supernovae: Explosion, neutron stars, black holes, and gravitational waves*
Physics frontier seminar, National Tsing Hua University, Hsinchu, Taiwan
- 09/2018 [†] *Multimessenger signals from stellar mass black hole formation*

[†]invited

- Taiwanese Theory Workshop, Academia Sinica Institute of Astronomy and Astrophysics, Taipei, Taiwan
- 09/2018 † *Core-collapse supernovae: Explosion, neutron stars, black holes, and gravitational waves*
Colloquium, Academia Sinica Institute of Astronomy and Astrophysics, Taipei, Taiwan
- 09/2018 † *Core-collapse supernovae: Explosion, neutron stars, black holes, and gravitational waves*
Physics colloquium, National Tsing Hua University, Hsinchu, Taiwan
- 10/2017 † *Multimessenger signals from stellar mass black hole formation*
TIARA miniworkshop on high energy astrophysics. Academia Sinica Institute of Astronomy and Astrophysics, Taipei, Taiwan
- 02/2017 † *Self-consistent, neutrino-driven core-collapse supernova simulations*
Physics Colloquium, National Tsing Hua University, Hsinchu, Taiwan
- 10/2016 *Self-consistent, neutrino-driven core-collapse supernova simulations*
CompAS Seminar, Academia Sinica Institute of Astronomy and Astrophysics, Taipei, Taiwan
- 04/2016 † *Multi-dimensional core-collapse supernova simulations with the isotropic diffusion source approximation*
Astronomy seminar, Michigan State University, East Lansing, MI, USA
- 01/2016 *Multi-D simulations of core-collapse supernovae*
CompAS Seminar, Academia Sinica Institute of Astronomy and Astrophysics, Taipei, Taiwan
- 08/2015 *The isotropic diffusion source approximation for multi-D supernova simulations*
The 2015 MICRA Meeting, Stockholm, Sweden
- 08/2015 † *Multi-dimensional simulations of core-collapse supernovae*
RIKEN Seminar, Wako, Saitama, Japan
- 06/2015 *Multi-dimensional core-collapse supernova simulations with the IDSA for neutrino transport*
Fifty-One-Ergs Conference, Raleigh, NC, USA
- 05/2015 † *Multi-dimensional core-collapse supernova simulations with the IDSA for neutrino transport*
Theory Seminar, Technische Universität, Darmstadt, Germany
- 03/2015 † *Search for surviving companions in type Ia supernova remnants*
HEP division seminar, Argonne National Lab, IL, USA
- 09/2014 *Two-dimensional core-collapse supernova simulations with the isotropic diffusion source approximation for neutrino transport*
Explosive stellar transients 2014 AG meeting at Bamberg, Germany
- 07/2013 *Search for surviving companions in type Ia supernova remnants*
CompAS Seminar, Academia Sinica Institute of Astronomy and Astrophysics, Taipei, Taiwan
- 07/2013 *Search for surviving companions in type Ia supernova remnants*
Astronomy colloquium, National Tsing-Hua University, Hsinchu, Taiwan
- 04/2013 *The fates of binary companions in type Ia supernovae within the single-degenerate scenario*
Nuclear, Particle and Astrophysics Seminar, Basel University, Basel, Switzerland
- 10/2012 *Impact of type Ia supernova ejecta on binary companions within the single-degenerate scenario and subsequent evolution of post-impact remnant stars*
ITC seminar, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, USA
- 09/2012 *Impact of type Ia supernova ejecta on binary companions within the single-degenerate scenario and subsequent evolution of post-impact remnant stars*
CTA Theoretical Astrophysics and General Relativity Seminar, University of Illinois at Urbana-Champaign, IL, USA

09/2012	<i>Impact of type Ia supernova ejecta on binary companions and subsequent evolution of post-impact remnant stars</i> Astronomy colloquium, National Tsing-Hua University, Hsinchu, Taiwan
04/2012	[†] <i>Impact of type Ia supernova ejecta on binary companions and subsequent evolution of post-impact remnant stars</i> CSE Annual Research Symposium, University of Illinois at Urbana-Champaign, IL, USA
10/2011	<i>Impact of type Ia supernova ejecta on binary companions</i> CTA Theoretical Astrophysics and General Relativity Seminar, University of Illinois at Urbana-Champaign, IL, USA
07/2011	<i>Impact of type Ia supernova ejecta on binary companions</i> CFD-MHD Seminar, Academia Sinica Institute of Astronomy and Astrophysics, Taipei, Taiwan
04/2011	[†] <i>Impact of type Ia supernova ejecta on binary companions</i> 9th Annual Workshop on Charm++ and its Applications, University of Illinois at Urbana-Champaign, IL, USA
04/2011	[†] <i>Impact of type Ia supernova ejecta on binary companions</i> CSE Annual Research Symposium, University of Illinois at Urbana-Champaign, IL, USA
01/2010	<i>Impact of type Ia supernova ejecta on a helium star binary companion</i> Astronomy colloquium, National Tsing-Hua University, Hsinchu, Taiwan
01/2009	<i>Type Ia supernovae in close binary systems</i> CFD-MHD Seminar, Academia Sinica Institute of Astronomy and Astrophysics, Taipei, Taiwan

Teaching

2023 Spring	11120PHYS290000 Computation for Physics, NTHU
2023 Spring	11120ASTR510000 Stellar Astrophysics, NTHU
2022 Fall	11110PHYS401300 Computational Physics Lab, NTHU
2022 Spring	11020ASTR660000 Computational Astrophysics, NTHU
2021 Fall	11010ASTR510000 Stellar Astrophysics, NTHU
2021 Spring	10920ASTR660000 Computational Astrophysics, NTHU
2020 Fall	10910ASTR510000 Stellar Astrophysics, NTHU
2020 Spring	10820ASTR660000 Computational Astrophysics, NTHU
2019 Fall	10810PHYS113308 General Physics B (I), NTHU
2019 Spring	10720ASTR660000 Computational Astrophysics, NTHU
2019 Spring	10720ASTR592000 Astronomy colloquium (II), NTHU
2018 Fall	10710ASTR591000 Astronomy colloquium (I), NTHU
2016	Master thesis co-advisor, Daniel Billingham (co-advised with Matthias Liebendörfer), Universität Basel. Thesis title: <i>Two Current Model for Stellar Explosions</i>
2013 – 2016	Mentor, Nuclear Astrophysics, Universität Basel.
2013	Lab instructor, PHYS 211 Mechanics, UIUC
2012	Teaching assistant, ASTR 542 Theoretical Stellar Physics, UIUC
2012	Teaching assistant, ASTR 540 Astrophysics, UIUC
2009	Teaching assistant, ASTR 406 Galaxies in the Universe, UIUC

2009 Teaching assistant, ASTR 121 Interstellar Medium and the Solar System, UIUC
2008 Teaching assistant, ASTR 210 General Astronomy, UIUC
2002 Advisor of astronomy club, National Hsinchu Girl's Senior High School, Taiwan

Advisees

Postdocs

2022/09 – Dr. Ramiz Aktar
2019/09 – 2021/07 Dr. He-Feng Hsieh (moved to NCTS)

PhD students

2021/09 – Li-Ting Ma (馬麗婷)
2019/09 – Inhyeok Song (송인혁)

Master students

2021/09 – Hao-Sheng Wang (王皓陞, 5 yrs combined under-master)
2021/07 – 2023/01 Hsin-Pei Chen (陳昕霏)
2020/09 – 2022/07 Yu-Hui Wang (王榆惠), Engineer at TSMC
2019/07 – 2022/01 Ting-Yuan Chen (陳廷元), Engineer at TSMC
2019/07 – 2021/07 Li-Ting Ma (馬麗婷), continues PhD with me
2019/09 – 2021/07 Shiau-Jie Rau (饒孝節), RA at NCTS

Undergraduate students

2022/09 – Yi-Fang Lee (李宜舫)
2022/07 – 2023/01 Hsin-Yu Chen (陳欣佑)
2020/06 – 2021/08 Hao-Sheng Wang (王皓陞)
2020/03 – 2020/08 Yu-Hui Wang (王榆惠)
2018/09 – 2019/08 Shiau-Jie Rau (饒孝節)
2018/09 – 2019/04 Hung-Hsiu Lin (林宏修)

Research assistant

2023/03 – Hsin-Pei Chen (陳昕霏)
2021/09 – 2022/06 Shiau-Jie Rau (饒孝節); Ph. D. student in UIUC

Summer students

2021/07 – 2021/08 Ching-Hsiang Wang (王慶祥), NTHU
2021/07 – 2021/08 Hsiang-Yu Yeh (葉翔宇), NTHU

Visiting students

2019/07 – 2019/09 Brian Yu (Ph.D. student at UCL)

High School students

2019/07 – 2020/03 Yi-Shuan Chen (陳弈玄), National Hsinchu Senior High School

Group Website



<https://kuochuanpan.github.io>