YI-XIAN CHEN

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EDUCATIONAL BACKGROUND

Department of Physics, Tsinghua University **Beijing**
Bachelor in Physics Sep 2017 - Expected Jun 2021

- **GPA:** 3.90/4.00 (Rank 7/47)
- **Awards & Honors:**
  Jiang Nan-xiang Scholarship (Highest Honor for Juniors), 2019
  Mathematical Contest in Modeling Honorable Mention, 2019
  Dec. 9th Scholarship (Highest Honor for Sophomores), 2018
  Scholarship for Outstanding Overall Performance, 2018&2019
  Scholarship for Outstanding Scientific Research, 2018&2019
  Chinese Undergraduate Physics Tournament First Prize, 2018
- **Programs:**
  Admitted into Tsinghua University Spark scholarship project, a top researcher cultivation program
  UCLA CSST 2020 research program admitted (90 students in mainland China, declined due to pandemic situation)
  Member of Chi-sun Yeh Physics class, part of Tsinghua University Xuetang talent cultivation program

Department of Foreign Languages, Tsinghua University **Beijing**
Minor in English Literature Sep 2018 - Expected Jun 2021

- **GPA:** 4.00/4.00
- Fluent in English, renowned oral speaker and debater, representing China in international speech contests
- **Awards & Honors:**
  China Daily "21st Century" Cup English Speaking Competition (College Group) National Championship, 2019
  English Speaking Union International Public Speech Contest (IPSC) Finalist/Third Place, 2019
  China Daily "21st Century" Cup English Speaking Competition (High School Group) National Championship, 2017

University of California, Berkeley **Berkeley**
Semester Exchange Program (Fall 2019) Aug 2019 - Dec 2019

- **GPA:** 4.00/4.00
- Department sponsored program ($8000 scholarship) for taking relevant courses and research

RESEARCH EXPERIENCES

Streamlines in Tidally Perturbed Accretion Disks **Beijing & Cambridge, England (virtual)**
Supervisor: Gordon Ogilvie, Professor, DAMTP, Cambridge June 2020 -

- Applied Lagrangian fluid dynamics to semi-analytically calculate the streamlines of materials in an accretion disk that suffers from distortion by an external perturber; these streamlines are a generalization of restricted-three-body trajectories in a Roche potential field, but with pressure propagation between adjacent streamlines

Halting Gas Giant Accretion with the Tidal Barrier **Beijing**
Supervisor: Douglas. N. C. Lin, Professor, Department of Astronomy, UC Santa Cruz May 2020 - August 2020

- Proposed that in low/moderate viscosity environments, gas giants can only accrete a small fraction of the materials within its Roche radius due to the conservation of vortensity and Bernoulli energy; This effect constrains the final mass of giant planets to be smaller than previously estimated, and conforms better with observation

Dust Accumulation at the Magnetospheric Truncation Radius **Beijing**

Supervisor: Douglas. N. C. Lin, Professor, Department of Astronomy, UC Santa Cruz April 2020 -

- Written original dust coagulation codes to study the accumulation of dust around the protoplanetary disk's inner boundary - the truncation radius; This is a mechanism parallel to the "Inside-Out Planet Formation" scenario (which accumulates dust at MRI boundary) and may also lead to sequential formation of terrestrial planets

Retention of Long-Period Gas Giants: A Revisit of Type II Migration **Beijing**

Supervisor: Douglas. N. C. Lin, Professor, Department of Astronomy, UC Santa Cruz Feb 2020 - May 2020

- Carried out hydrodynamic simulations combined with an analytic study to examine the transition between different paradigms of type II migration for gap-opening planets, relevant work accepted by ApJ
- Analyzed the mechanism of gas flow across depleted gap so that the surface density distribution is maintained in a quasi-steady state, and how migration rate lies delicately on the balance of low-order Lindblad torques

Preservation of Super-Earths After Pebble-Isolation Phase **Beijing & Berkeley**

Supervisor: Douglas. N. C. Lin, Professor, Department of Astronomy, UC Santa Cruz Dec 2018 - Mar 2020

- Constructed analytical and numerical models for planet-disk interactions and planetary atmosphere evolution, identified an important mechanism that quenches super-Earth gas accretion, relevant work accepted by ApJ
- Oral presentation of the topic in *Formation and Evolution of Planetary System Conference* (Urumqi, July 2019), invited by TCAN (Theoretical Computational Astrophysics Network) members in UArizona to give a talk on the relevant paper (virtual), Poster presentation in Exoplanet III meeting, Heidelberg (virtual).

Microlensing of the Galactic Center Supermassive Black Hole **Berkeley**

Supervisor: Jessica R. Lu, Associate Professor, Department of Astronomy, UC Berkeley Sep 2019 - May 2020

- Developed new and more efficient approaches to model stellar distribution and numerically calculate Microlensing rate based on the methodologies put forward 20 years ago and implemented them with new codes
- Analyzed with updated data from last 20 years' observations, achieving newer and more accurate results

High-energy Radiation Analysis of Active Galactic Nuclei **Beijing**

Department Student Research Program (SRT) Jul 2018 - Mar 2019

Supervisor: Youhong Zhang, Associate Professor, Department of Physics, Tsinghua University

- Analyzed data from Fermi Telescope to calculate variance of AGN light-curves with C++ and python on Ubuntu system, Received A+ in evaluation of contribution to the project, see detailed research report

Mathematical Contest in Modeling (MCM) **Beijing**

Honorable Mention Reward Jan 2019

- Optimized the allocation and packing of drones to deliver medical aid to hospitals in the (hypothetically) hurricane-struck island of Puerto Rico, as well as a surveillance plan of road conditions

Chinese Undergraduate Physics Tournament (CUPT) **Beijing**

First Prize, College Competition Oct 2017 - Mar 2018

- Conducted simulations and experiments on physical phenomenon such as *Acoustic Levitation, Heron Fountain*, learned to use field simulation software *Comsol;* Gave oral presentation and defense on projects

PUBLICATIONS

1. **Chen Y.X.***, Li Y.P., Li H., Lin D.N.C., *The Preservation of Super Earths and the Emergence of Gas Giants after Their Progenitor Cores have Entered the Pebble Isolation Phase*, The Astrophysical Journal, 896, 135
2. **Chen Y.X.*,** Zhang X., Li Y.P., Li H., Lin D.N.C., *Retention of Long-Period Gas Giant Planets: Type II Migration Revisited*, Accepted by ApJ
3. **Chen Y.X.***, Lu J. R., *Microlensing by Galactic Center Supermassive Black Hole*, to be submitted
4. Li Y.P., **Chen Y.X.*,** Zhang X., Li H., Lin D.N.C., *Halting Gas Giant Accretion with Tidal Barrier*, to be submitted
5. Li R.*, **Chen Y.X.**, Lin D.N.C., *Dust-Accumulation & Planet Formation near the Magnetosphere Truncation Radius*, in preparation

(* indicates corresponding author)

SCIENTIFIC TALKS

- The Preservation of Hot Super Earths and Cold Gas Giants — **Tucson, Arizona (Virtual)**
  Online Talk, invited by Theoretical Computational Astrophysics Network members in UArizona — Jun 2020
- Introduction to Planetary Astrophysics — **Beijing**
  Chi-sun Yeh Academic Lectures, Tsinghua University — May 2020
- Formation of Close-in Planets (sub-Neptunes/super-Earths) — **Beijing**
  Department of Astronomy (DoA) seminar on theoretical astrophysics, Tsinghua University — Apr 2020
- Galactic Center Microlensing — **Berkeley, California**
  Introduction of research project — Dec 2019
- Dust Diffusion in Protoplanetary Disks and Formation of super Earths — **Urumqi, Xinjiang**
  Introduction of research project, Formation and Evolution of Planetary System Conference — Jul 2019
- Linear Magneto-Rotational Instability — **Beijing**
  Department of Astronomy (DoA) seminar on theoretical astrophysics, Tsinghua University — Apr 2019
- Understanding Migration of Gas Giants — **Beijing**
  Introduction of research project — Aug 2019

CONFERENCES

- **Exoplanets III, Heidelberg (Virtual)** — July 2020
- **Sagan Workshop on Extreme Precision Radial Velocity, Pasadena, California (Virtual)** — July 2020
- **Formation and Evolution of Planetary System Seminar, Urumqi, Xinjiang** — July 2019
- **Astrophysical Dynamics Conference, Shanghai** — July 2019

SKILLS AND INTERESTS

Programming: Mathematica, Matlab, python, C++, HTML, LaTeX

Music and Vocal performance:

- Member of Tsinghua University chorus and Berkeley Chinese Acappella, performed in various concerts and competition), Award-winning campus singer, Guest performer at student gala
- Live vocal performances: *My Way*, *Wandering Earth Theme*

Film production:

- Wrote screenplays for and produced short play/film *Ode to Guitar (2018)* and *A Wicked Letter Through Time (2019)*, well-received by audiences in Department Student Gala (English subtitles TBA)
- Taken screenwriting courses at Berkeley Extension, part of my final project *Singularity*

Secretary of Student Union, Department of Entertainment:

- Organized student gala and festivals; Proficient in propaganda article writing and poster designing