

Min-Kai Lin

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Employment

Canadian Institute for Theoretical Astrophysics

Postdoctoral Fellow

2011–2014

Education

University of Cambridge

PhD in Theoretical Astrophysics

2011

Thesis: Dynamical instabilities in disc-planet interactions

Advisor: Professor John C.B. Papaloizou

University of Cambridge

BA and MSci in Natural Sciences: Astrophysics (First class honors)

2008

Natural Sciences Tripos Part III project: Planet migration via planetesimal scattering

Advisors: Mark C. Wyatt and Jim E. Pringle

Natural Sciences Tripos Part II literature review: Spurs in spiral galaxies

Advisors: Jim E. Pringle and Robert C. Kennicutt

Awards and honors

- Smith Rayleigh Knight Prize 2010
- Fellow of the Cambridge Overseas Society 2008
- St. John's College Benefactors' Scholarship 2008
- Isaac Newton Studentship 2008
- Overseas Research Scholarship 2008
- Institute of Astronomy Prize (top of class) 2008
- JS Wilson Prize for Natural Sciences 2006, 2007, 2008
- College Awarded Bursary 2007
- Skerne Scholarship 2005, 2006, 2007, 2008
- College Book Prize for Academic Distinction 2005, 2006, 2007, 2008

Teaching and supervision

CITA, University of Toronto

Undergraduate summer student program

2012

Student: R. Cloutier

Project: Orbital migration of giant planets induced by gravitationally unstable gaps (published in MNRAS)

Clare College, University of Cambridge

Mathematics IA for Natural Sciences

2008—2011

Presentations

- *Gravitational instability of planetary gaps and its effect on orbital migration*
IAUS 299: Exploring the Formation and Evolution of Planetary Systems, Victoria, Canada Jun. 2013
University of Toronto May 2013
- *Large-scale hydrodynamic instabilities in protoplanetary disks*
MIT Apr. 2013
Harvard-Smithsonian Center for Astrophysics Apr. 2013
- *Large-scale vortex formation in protoplanetary disks*

Cornell University (invited talk)	Feb. 2013
Princeton University	Feb. 2013
University of Toronto	Nov. 2012
○ <i>Vortices and spirals at gap edges in 3D self-gravitating disk-planet simulations</i>	
American Geophysical Union Fall Meeting, San Francisco, USA	Dec. 2012
Instabilities and Structures in Protoplanetary Disks, Marseille, France	Sep. 2012
○ <i>Planet migration with gravitationally unstable gaps</i>	
DAMTP, University of Cambridge	Oct. 2011
○ <i>Vortex instabilities in self-gravitating disc-planet interactions</i>	
Baroclinic Instability and Protoplanetary Accretion Disks, Ringberg, Germany	Jun. 2011
○ <i>The stability of self-gravitating gaps</i>	
Academia Sinica Institute of Astronomy and Astrophysics, Taipei, Taiwan	Nov. 2010
DAMTP, University of Cambridge	Nov. 2010
○ <i>Spin down of protostars through gravitational disk torques</i>	
East Asian Numerical Astrophysics Meeting, ASIAA, Taiwan	Nov. 2010
International Summer Institute for Modeling in Astrophysics, UC Santa Cruz, USA	Aug. 2010
○ <i>Type III migration in a low viscosity disc.</i>	
American Museum of Natural History, New York City, USA	Jan. 2010
Winter Workshop on Planetary Astrophysics, KIAA, Peking University, China	Dec. 2009
DAMTP, University of Cambridge	Oct. 2009
○ <i>Vortices in planetary migration</i>	
Dynamics of Discs and Planets, Cambridge, UK	Aug. 2009
○ <i>Three-layer magnetoconvection</i>	
UKMHD, Coventry University, UK	Jun. 2009

Other work experiences

UC Santa Cruz

ISIMA summer student 2010

Project: Numerical simulations of star-disk interaction, with M. Krumholz and K. Kratter

DAMTP, University of Cambridge

Summer student 2007

Project: Three-layer magneto-convection, with L. Silvers and M. Proctor

ASIAA, Taipei, Taiwan

Summer/visiting student 2005,2006

Project: Bar-driven density waves in galactic disks, with C. Yuan and D.C.C. Yen

Academic services

Referee, Astronomy and Astrophysics 2013—

Referee, Astrophysics and Space Science 2013—

Computing

Languages: Fortran, C, IDL, Mathematica

Astrophysical fluid codes: Fargo, Zeus, Pluto, Athena

Publications

Submitted articles:

1. *Gravitational instability of planetary gaps and its effect on orbital migration*
Lin, M.-K., *Cloutier, R., IAUS 299 proceedings 2013

Refereed publications:

13. *Testing large-scale vortex formation against viscous layers in three-dimensional discs*
Lin, M.-K., MNRAS, in press 2013
12. *Steady state of dust distributions in disk vortices: observational predictions and applications to transitional disks*
Lyra, W., **Lin, M.-K.**, ApJ, 775, 17 2013
11. *Orbital migration of giant planets induced by gravitationally unstable gaps: the effect of planet mass*
*Cloutier, R., **Lin, M.-K.**, MNRAS, 434, 621 2013
10. *Non-barotropic linear Rossby wave instability in three-dimensional disks*
Lin, M.-K., ApJ, 765, 84 2013
9. *Effects of upper disc boundary conditions on the linear Rossby wave instability*
Lin, M.-K., MNRAS, 428, 19 2013
8. *Vortex and spiral instabilities at gap edges in three-dimensional self-gravitating disc-satellite simulations*
Lin, M.-K., MNRAS, 426, 3211 2012
7. *Rossby wave instability in locally isothermal and polytropic disks: three-dimensional linear calculations*
Lin, M.-K., ApJ, 754, 21 2012
6. *Outward migration of a giant planet with a gravitationally unstable gap edge*
Lin, M.-K., Papaloizou, J.C.B., MNRAS, 421, 780 2012
5. *Spin-down of protostars through gravitational torques*
Lin, M.-K., Krumholz, M. R., Kratter, K. M., MNRAS, 416, 580 2011
4. *Edge modes in self-gravitating disc-planet interactions*
Lin, M.-K., Papaloizou, J.C.B, MNRAS, 415, 1445 2011
3. *The effect of self-gravity on vortex instabilities in disc-planet interactions*
Lin, M.-K., Papaloizou, J.C.B, MNRAS, 415, 1426 2011
2. *Type III migration in a low viscosity disc*
Lin M.-K., Papaloizou, J.C.B, MNRAS, 405, 1473 2010
1. *Three-layer magnetoconvection*
Lin, M.-K., Silvers, L. J., Proctor, M.R.E., Physics Letters A, 373, 69 2008

*student

Conference proceedings and abstracts:

2. *Instabilities at planetary gap edges in 3D self-gravitating disks*
Lin, M.-K., Instabilities and Structures in Proto-Planetary Disks, Marseille, France, EPJ Web of Conferences, 46, id.07001 2013
1. *Evolution of bar-driven disks under the influence of the interaction between two inner Lindblad resonances*
Yuan, C., Yen, D. C. C., **Lin, M.-K.**, AAS Meeting 207, #188.04 2005

Citations

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12. Lyra, W., Lin, M.-K., 2013, ApJ, 775, 17	2
11. Cloutier, R., Lin, M.-K., 2013, MNRAS, 434, 621	0
10. Lin, M.-K., 2013, ApJ, 765, 84	4
9. Lin, M.-K., 2013, MNRAS, 428, 19	2
8. Lin, M.-K., 2012, MNRAS, 426, 3211	10
7. Lin, M.-K., 2012, ApJ, 754, 21	20
6. Lin, M.-K., Papaloizou, J.C.B., 2012, MNRAS, 421, 780	8
5. Lin, M.-K., Krumholz, M. R., Kratter, K. M., 2011, MNRAS, 416, 580	6
4. Lin, M.-K., Papaloizou, J.C.B, 2011, MNRAS, 415, 1445	13
3. Lin, M.-K., Papaloizou, J.C.B, 2011, MNRAS, 415, 1426	17
2. Lin M.-K., Papaloizou, J.C.B, 2010, MNRAS, 405, 1473	19
1. Lin, M.-K., Silvers, L. J., Proctor, M.R.E., Physics Letters A, 373, 69	1