

# Tsang Keung Chan: CURRICULUM VITAE

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## Education

University of California, San Diego	<b>Ph.D. Candidate in Physics</b> Thesis advisor: Prof. Dušan Kereš	Sep 2013 - Present
The Chinese University of Hong Kong	<b>M.Phil. in Physics</b> Thesis advisor: Prof. Pui Tang Leung	2011 - 2013
The Chinese University of Hong Kong	<b>B.S. in Physics with First-class Honors</b>	2008 - 2011
University of California, Berkeley	<b>Overseas Program for Undergraduate Students</b>	Jan-Aug 2010

Research Interests: *Galaxy simulations with a focus on stellar feedback*

- Cosmic ray feedback in galaxy simulations
- The structure of dark matter halos
- The origin of ultra diffuse galaxies
- Cosmological simulations of galaxy formation

## Research Experiences and Skills

- Collaborating with members from different major universities, resulting in tens of publications
- Running large scale simulations on several national supercomputing centers
- Handling and analysing thousands TB data sets
- Programming in python, C, fortran, mathematica
- Parallel computing with MPI and OpenMP
- Co-developing modules in the GIZMO code

## Grants, Honors and Awards

- UC San Diego Graduate Student Association Travel Grant 2018
- UC San Diego Physics Chair's Challenge Travel Grant 2017
- Professor Charles K. Kao Student Research Exchange Scholarship 2010
- Chung Chi Scholarships for Excellence, the Chinese University of Hong Kong 2010
- Dean's Honours List, the Chinese University of Hong Kong 2009
- CN Yang Scholarship, the Chinese University of Hong Kong 2009, 2011
- Bronze medal, International Physics Olympiad 2007

## Publications

### *First Author*

- [1] T. K. Chan et al. "Cosmic ray feedback in the FIRE simulations: constraining cosmic ray propagation with GeV gamma ray emission". In: *MNRAS* (submitted). arXiv: 1812.10496.
- [2] T. K. Chan et al. "The origin of ultra diffuse galaxies: stellar feedback and quenching". In: *MNRAS* 478 (July 2018), pp. 906–925. DOI: 10.1093/mnras/sty1153. arXiv: 1711.04788.

- [3] T. K. Chan, A. P. O. Chan, and P. T. Leung. “Universality and stationarity of the I-Love relation for self-bound stars”. In: *Phys. Rev. D* 93.2, 024033 (Jan. 2016), p. 024033. DOI: 10.1103/PhysRevD.93.024033. arXiv: 1511.08566 [gr-qc].
- [4] T. K. Chan et al. “The impact of baryonic physics on the structure of dark matter haloes: the view from the FIRE cosmological simulations”. In: *MNRAS* 454 (Dec. 2015), pp. 2981–3001. DOI: 10.1093/mnras/stv2165. arXiv: 1507.02282.
- [5] T. K. Chan, A. P. O. Chan, and P. T. Leung. “I-Love relations for incompressible stars and realistic stars”. In: *Phys. Rev. D* 91.4, 044017 (Feb. 2015), p. 044017. DOI: 10.1103/PhysRevD.91.044017. arXiv: 1411.7141 [astro-ph.SR].
- [6] T. K. Chan et al. “Multipolar universal relations between f-mode frequency and tidal deformability of compact stars”. In: *Phys. Rev. D* 90.12, 124023 (Dec. 2014), p. 124023. DOI: 10.1103/PhysRevD.90.124023. arXiv: 1408.3789 [gr-qc].

### Co-author

- [1] Z. Hafen et al. “The Origins of the Circumgalactic Medium in the FIRE Simulations”. In: *arXiv e-prints*, arXiv:1811.11753 (Nov. 2018), arXiv:1811.11753. arXiv: 1811.11753 [astro-ph.GA].
- [2] Kung-Yi Su et al. “Cosmic Rays or Turbulence can Suppress Cooling Flows (Where Thermal Heating or Momentum Injection Fail)”. In: *arXiv e-prints*, arXiv:1812.03997 (Dec. 2018), arXiv:1812.03997. arXiv: 1812.03997 [astro-ph.GA].
- [3] R. E. Sanderson et al. “Reconciling Observed and Simulated Stellar Halo Masses”. In: *ApJ* 869, 12 (Dec. 2018), p. 12. DOI: 10.3847/1538-4357/aaeb33. arXiv: 1712.05808.
- [4] K. El-Badry et al. “Gas kinematics in FIRE simulated galaxies compared to spatially unresolved H I observations”. In: *MNRAS* 477 (June 2018), pp. 1536–1548. DOI: 10.1093/mnras/sty730.
- [5] M. E. Orr et al. “What FIREs up star formation: the emergence of the Kennicutt-Schmidt law from feedback”. In: *MNRAS* 478 (Aug. 2018), pp. 3653–3673. DOI: 10.1093/mnras/sty1241. arXiv: 1701.01788.
- [6] K. L. S. Yip, T. K. Chan, and P. T. Leung. “Perturbative solution to the Lane-Emden equation: an eigenvalue approach”. In: *MNRAS* 465 (Mar. 2017), pp. 4265–4280. DOI: 10.1093/mnras/stw3041. arXiv: 1611.07202 [astro-ph.SR].
- [7] K. El-Badry et al. “When the Jeans Do Not Fit: How Stellar Feedback Drives Stellar Kinematics and Complicates Dynamical Modeling in Low-mass Galaxies”. In: *ApJ* 835, 193 (Feb. 2017), p. 193. DOI: 10.3847/1538-4357/835/2/193. arXiv: 1610.04232.
- [8] M. E. Orr et al. “Stacked Star Formation Rate Profiles of Bursty Galaxies Exhibit Coherent Star Formation”. In: *ApJL* 849, L2 (Nov. 2017), p. L2. DOI: 10.3847/2041-8213/aa8f93. arXiv: 1709.10099.
- [9] P. F. Hopkins et al. “FIRE-2 simulations: physics versus numerics in galaxy formation”. In: *MNRAS* 480 (Oct. 2018), pp. 800–863. DOI: 10.1093/mnras/sty1690. arXiv: 1702.06148.
- [10] Z. Hafen et al. “Low-redshift Lyman limit systems as diagnostics of cosmological inflows and outflows”. In: *MNRAS* 469 (Aug. 2017), pp. 2292–2304. DOI: 10.1093/mnras/stx952. arXiv: 1608.05712.
- [11] F. van de Voort et al. “On the deuterium abundance and the importance of stellar mass loss in the interstellar and intergalactic medium”. In: *MNRAS* 477 (June 2018), pp. 80–92. DOI: 10.1093/mnras/sty591. arXiv: 1704.08254.
- [12] A. Fitts et al. “fire in the field: simulating the threshold of galaxy formation”. In: *MNRAS* 471 (Nov. 2017), pp. 3547–3562. DOI: 10.1093/mnras/stx1757. arXiv: 1611.02281.
- [13] A. L. Muratov et al. “Metal flows of the circumgalactic medium, and the metal budget in galactic haloes”. In: *MNRAS* 468 (July 2017), pp. 4170–4188. DOI: 10.1093/mnras/stx667. arXiv: 1606.09252.
- [14] F. van de Voort et al. “The impact of stellar feedback on hot gas in galaxy haloes: the Sunyaev-Zel’dovich effect and soft X-ray emission”. In: *MNRAS* 463 (Dec. 2016), pp. 4533–4544. DOI: 10.1093/mnras/stw2322. arXiv: 1604.01397.

- [15] K. El-Badry et al. “Breathing FIRE: How Stellar Feedback Drives Radial Migration, Rapid Size Fluctuations, and Population Gradients in Low-mass Galaxies”. In: *ApJ* 820, 131 (Apr. 2016), p. 131. DOI: 10.3847/0004-637X/820/2/131. arXiv: 1512.01235.
- [16] Y.-H. Sham et al. “Unveiling the Universality of I-Love-Q Relations”. In: *ApJ* 798, 121 (Jan. 2015), p. 121. DOI: 10.1088/0004-637X/798/2/121. arXiv: 1410.8271 [gr-qc].
- [17] Y. J. Zhang et al. “Separation of space-time and matter in polar oscillations of compact stars”. In: *MNRAS* 438 (Mar. 2014), pp. 3222–3232. DOI: 10.1093/mnras/stt2428.

### Reports

- Summer Research Report on “the effect of muon propagation on underground dark matter detection experiments”, with Prof. Kam Biu Luk in University of California Berkeley, Aug 2010

### Conferences and Workshops

#### Talks

- *Invited Talk* at “*The Bewildering Nature of Ultra-diffuse Galaxies*” workshop at Lorentz Center, Leiden, Netherlands 2018
- Santa Cruz workshop on galaxy formation at University of California at Santa Cruz, United States 2015,2017,2018
- Galaxy Formation and Evolution in Southern California at California institute of technology, Pasadena,United States 2017
- Feedback In Realistic Environment workshop at University of California at Berkeley, United States 2016
- at California institute of technology, Pasadena, United States 2015
- at Northwestern University, Evanston, United States 2014

#### Poster Presentations

- 15th Potsdam Thinkshop on “*Understanding the role of feedback in galaxy formation*” at Potsdam, Germany 2018
- 228th American Astronomical Society meeting at San Diego, United States 2016

### Teaching

- Teaching assistant for PHYS 7 “*Galaxies and Cosmology*” by Prof. Karin Sandstrom, at University of California at San Diego Winter 2016
- Teaching assistant for PHY2005 “*Quantitative Methods for Basic Physics II*” by Prof. Emily S.C. Ching, at the Chinese University of Hong Kong Second Term, 2013
- Teaching assistant for PHY2351 “*Basic Computational Physics*” by Dr. Lin Lap Ming, at the Chinese University of Hong Kong First Term 2012

### Outreach

- Laboratory Demonstrator at *Tech Trek* 2017
- Laboratory Demonstrator at *IOA Science & Innovation camp* 2017

## References

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