XUEJIAN(JACOB) SHEN

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California Institute of Technology

1200 E. California Blvd, Pasadena, CA 91125 USA

EDUCATION

California Institute of Technology　　　　　　　　　　　　　　　*Sept. 2018 - Present*

Ph.D. Candidate, Physics

Division of Physics, Math and Astronomy, California Institute of Technology, Pasadena, CA, USA

Academic and Research Advisor: Prof. Philip Hopkins

Thesis Title: Cosmic structure and galaxy formation in alternative dark matter

Peking University　　　　　　　　　　　　　　　　　　　　　*Sept. 2014 - June 2018*

B.S., Physics

Department of Physics, Peking University, Beijing, China

Advisor: Prof. Fukun Liu

Thesis Title: "Strengthened Kozai-Lidov Oscillation, Tidal Disruption Event Rate and Gravitational Wave in Hierarchical SMBH Triplets"

EMPLOYMENT

Graduate Teaching Assistant　　　　　　　　　　　　　　　　Jan. 2018 - Present

California Institute of Technology, Pasadena, CA, USA

Undergraduate Summer Research Internship　　　　　　　　July 2017 - Sept 2017

Kavli Institute for Astrophysics and Space Research, Massachusetts Institute of Technology, Cambridge, MA, USA

RESEARCH INTERESTS

Cosmological simulations of galaxy formation; Astrophysical constraints of the nature of dark matter; Galaxies and quasars at high redshift

PUBLICATIONS (FIRST-AUTHOR/MAJOR CONTRIBUTION)

1. Vogelsberger, Mark; Nelson, Dylan; Pillepich, Annalisa; Shen, Xuejian et al. (2020), **High redshift JWST predictions from IllustrisTNG: Dust modelling and galaxy luminosity functions**, Monthly Notices of the Royal Astronomical Society 492 (4), 5167-5201

2. Shen, Xuejian; Hopkins, Philip; Faucher-Giguère, Claude-André; Alexander, Dave; Richards, Gordon; Ross, Nicholas; Hickox, Ryan (2020), **The Bolometric Quasar Luminosity Function at z = 0 − 7**, Monthly Notices of the Royal Astronomical Society 495 (3), 3252-3275

3. Shen, Xuejian; Vogelsberger, Mark; Nelson, Dylan; Pillepich, Annalisa et al. (2020), **High redshift JWST predictions from IllustrisTNG: II. Galaxy line and continuum spectral indices and dust attenuation curves**, Monthly Notices of the Royal Astronomical Society 495 (4), 4747-4768

4. Shen, Xuejian; Hopkins, Philip; Necib, Lina et al. (2021), **Dissipative Dark Matter on FIRE: I. Structural and kinematic properties of dwarf galaxies**, Monthly Notices of the Royal Astronomical Society 506 (3), 4421-4445

5. Shen, Xuejian; Vogelsberger, Mark; Nelson, Dylan; Pillepich, Annalisa et al. (2021), **High redshift**

JWST predictions from IllustrisTNG: III. Infrared luminosity functions, obscured star formation and dust temperature of high-redshift galaxies, arXiv:2104.12788

6. Xiao, Huangyu; Shen, Xuejian; Zurek, Kathryn; Hopkins, Philip (2021), **SMBH seeds from dissipative dark matter**, Journal of Cosmology and Astroparticle Physics 2021 (07), 039-43

7. Shen, Xuejian; Hopkins, Philip; Necib, Lina et al. (2022), **Dissipative Dark Matter on FIRE: II. Observational signatures and constraints from local dwarf galaxies** (to be submitted)

8. Shen, Xuejian; Thejs Brinckmann; David Rapetti et al. (2022), **X-ray morphology of cluster-mass haloes in self-interacting dark matter** (submitted to MNRAS)

PUBLICATIONS (ADVISORY/COLLABORATIVE)

1. Lovell, Mark R.; Zavala, Jesús; Vogelsberger, Mark; Shen, Xuejian; Cyr-Racine, Francis-Yan et al. (2018), **ETHOS − an effective theory of structure formation: predictions for the high-redshift Universe − abundance of galaxies and reionization**, Monthly Notices of the Royal Astronomical Society 477 (3), 2886-2899

2. Wang, Yunchong; Vogelsberger, Mark; Xu, Dandan; Shen, Xuejian et al. (2019), **Early-type galaxy density profiles from IllustrisTNG − II. Evolutionary trend of the total density profile**, Monthly Notices of the Royal Astronomical Society, 490 (4), 5722-5738

3. Mocz, Philip; Fialkov, Anastasia; Vogelsberger, Mark; Becerra, Fernando; Shen, Xuejian et al. (2019), **Galaxy Formation with BECDM − II. Cosmic Filaments and First Galaxies**, Monthly Notices of the Royal Astronomical Society 494 (2), 2027-2044

4. Emami, Razieh; Hernquist, Lars; Alcock, Charles; Genel, Shy et al. (2021), **Inferring the Morphology of Stellar Distribution in TNG50: Twisted and Twisted-stretched Shapes**, The Astrophysical Journal 918 (1), 7-24

5. Kannan, Rahul; Smith, Aaron; Garaldi, Enrico; Shen, Xuejian et al. (2022), **The THESAN project: predictions for multi-tracer line intensity mapping in the Epoch of Reionization**, arXiv:2111.02411

RESEARCH INDICES AND METRICS

Total refereed papers: 10   Total citations: 287   Total number of reads: 5407
h-index: 9   i10-index: 8
Full publication list (ADS)

TECHNICAL STRENGTHS

Natural Languages	Native in Mandarin. Fluent in English.
Programming Languages	Proficient in Python, Mathematica, C and Linux shell.
	Experience in C++, MATLAB.
Markup Languages	Proficient in LaTeX. Experience in HTML.

TALKS

The bolometric quasar luminosity function	Caltech group meeting (2019.4)
High-z prediction with Illustris-TNG	Caltech group meeting (2019.8)
High-z prediction with Illustris-TNG	MIT Compulational Structure and Galaxy Formation group meeting (2019.11)
Dissipative dark matter on FIRE	Caltech group meeting (2020.4)
Alternative dark matter and structure formation	Invited talk, Observational cosmology seminar Caltech (2021.7)
Axion miniclusters in the Milky Way halo environment	Caltech group meeting (2022.2)
Dissipative dark matter on FIRE: structual and kinematic properties of dwarfs and observational signatures	AAS, the 240th meeting (Pasadena, CA, 2022)

TEACHING & ADVISING

Caltech Graduate Teaching Assistant	Compulational Physics Lab Ph20/21/22 (2019 - 2022)
Caltech SURF program 2021	Co-advisor of Gabriel Aguiar
Caltech SURF program 2022	Co-advisor of Eitan Rapaport

AWARDS

James A. Cullen Memorial Fellowship 2022
Caltech,The Division of Physics, Mathematics and Astronomy

Honored Graduate 2018
Peking University

Meritorious Award 2017
Mathematical Contest in Modeling (MCM)

Silver Medal 2013
National Final of the 30th Chinese Physics Olympiad (CPHO)