Sai Chaitanya Tadepalli

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RESEARCH INTERESTS

Early universe cosmology. Inflation and cosmic perturbations. Axionic cosmology. Fuzzy and warm dark matter. EFTofLSS- and UVLF-based cosmology. Data analysis. AI in Cosmology.

EMPLOYMENT/RESEARCH EXPERIENCE

Indiana University, Bloomington — Bloomington, IN, USA
Postdoctoral Fellow, Dept. of Physics — 2024-Present

My research lies at the interface of **theoretical and particle cosmology, numerical simulations, and cosmological data analysis**. A central theme of my work is to understand how new fields and nontrivial dynamics in the early and late Universe generate observable signatures. My research connects fundamental model building to phenomenology, with particular emphasis on axions and primordial fluctuations, nonstandard and mixed dark matter models, applying N-body sims, EFT-based methods and simulations to constrain phenomenological models using probes ranging from large-scale structure to high-redshift galaxy UV luminosity functions on small-scales.

ITER-India, Institute for Plasma Research (*Pre-Ph.D*) — Gandhinagar, INDIA
Scientific Officer — 2014-2018

Conducted research in fusion neutronics with emphasis on nuclear activation and computational methods. Developed a nuclear activation software, now adopted by the ITER fusion reactor (France), and performed nuclear analyses for fusion systems. This work was recognized with nomination for the Young Scientist Award. I resigned in 2018 to pursue Ph.D. in Physics.

EDUCATION

Sri Sathya Sai Institute for Higher Learning — Prashanthi Nilayam, Andhra Pradesh
Bachelor of Science, Physics — 2007-2010

University of Delhi & University of Paris — Delhi, INDIA & Paris, FRANCE
M. Tech in Nuclear Science and Technology — 2010-2013

University of Wisconsin-Madison — Madison, WI, USA
Master of Science, Physics — 2021

University of Wisconsin-Madison — Madison, WI, USA

Ph.D. in Physics 2018-2024
Advisor: Prof. Daniel J H Chung

TEACHING EXPERIENCE

Indiana University, Bloomington Bloomington, IN, USA
Advanced Cosmology Reading Course, Dept. of Physics Summer 2025

University of Wisconsin-Madison Madison, WI, USA
90min lecture on EFTofLSS in Cosmology, Dept. of Physics 2024

University of Wisconsin-Madison Madison, WI, USA
Teaching Assistant, Dept. of Physics 2018-2023

AWARDS AND SCHOLARSHIPS

Van Vleck Research Award, Dept. of Physics, U. of Wisconsin-Madison 2021
Award from IRSN, France for excellent work during internship Sept 2012
Scholarship grant by Ministry of Foreign Affairs, France Aug 2011- Sept 2012

SCHOOLS

TASI Summer School at Colorado, USA June 2022
KIT Summer School on Fusion Technologies at Karlsruhe, Germany Sept 2016

SEMINAR TALKS

1. Invited talk at University of Florida, Gainesville, USA Oct 2026
2. Invited talk at Rice University, Houston, USA Aug 2026
3. Invited talk at University of Notre Dame, Indiana, USA Sept 2025
4. Seminar talk at IIT-Gandhinagar, India Nov 2024
5. Seminar talk at Physical Research Lab, Ahmedabad, India Oct 2024
6. Seminar talk at Ahmedabad University, India Oct 2024
7. Invited talk at Perimeter Institute, Ontario, Canada Feb 2024
8. Invited talk at Indiana University-Bloomington Jan 2024
9. Seminar Talk at Kavli Institute for Cosmological Physics, Chicago Jan 2024
10. Invited talk at Fermilab, Chicago Jan 2024
11. Seminar talk at Univ. of Michigan, Ann Arbor Oct 2023
12. Seminar talk at Harvard Univ, Boston Oct 2023
13. Research presentation at Flatiron Institute, New York Oct 2023
14. Seminar talk at Thanu Padmanabhan CCSP, SGT University, India Apr 2023
15. Seminar talk at Tata Institute for Fundamental Research, Mumbai, India Mar 2023
16. Seminar talk at IISER, Pune, India Mar 2023