DEOVRAT PRASAD

Physics and Astronomy
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RESEARCH INTERESTS

Feedback Processes in Galaxies, Groups and Clusters
Galaxy Formation and Evolution
Accretion onto Super Massive Black Holes
Numerical Methods

EMPLOYMENT

Postdoctoral Fellow, November 2022 - June 2025, Cardiff University, Cardiff, UK

Postdoctoral Fellow, July 2018 - June 2022, Michigan State University, East Lansing, US

EDUCATION

PhD, Astronomy and Astrophysics, CSIR Junior/Senior Research Fellow
June 2018, Indian Institute of Science, Bangalore, India
Thesis:- AGN Feedback In Galaxy Clusters - Controlling cooling flows in galaxy clusters by momentum-driven AGN jets
Advisor :- Prateek Sharma

Integrated M.Sc. (5 year program), Physics, INSPIRE Fellow
2012, University of Mumbai, Mumbai, India

FELLOWSHIPS

INSPIRE fellowship, 2007-12, Dept. Of Science and Technology, Govt. Of India.

CSIR-UGC NET fellowship, 2012-2017, 24th All India Rank in National Eligiblity Test (June-2012)

COMPUTING GRANTS

SCW (Hawk & Sunbird) :Studying the evolution of massive galaxies with cold-mode AGN feedback at low redshift, (**Co-PI, 1.0 million CPU hours**) Nov 2022 - Dec 2025

INCITE (Frontier - Oak Ridge Leadership Computing Facility) : Feedback and Energetics from Magnetized AGN Jets in Galaxy Groups and Clusters (**Co-PI, 630 K + 600 K GPU node hours**) Jan 2023 - Dec 2024

NSF XSEDE (Stampede & Expanse) : Probing Galaxy Formation at Low and High Redshifts
(**Co-PI, 1.6 million CPU hours**) Jan 2022 - Dec 2022

NSF XSEDE (Comet & Expanse) : Precipitation-Regulated AGN Feedback in Halos From 10^{12} — 10^{15} $M_{\odot}$ (**PI, 2.05 million CPU hours**) Jan 2021 - June 2022.

NSF XSEDE (Comet) : Precipitation-Regulated AGN Feedback in Halos From 10^{12} — 10^{15} $M_{\odot}$

(**PI, 1.23 million CPU hours**) July 2019 - June 2020.

REVIEW EXPERIENCE

2025, subject matter expert reviewer for a publication in *Science*.

2025, subject matter expert reviewer for a publication in *The Astrophysical Journal*.

2024, subject matter expert review for UKRI funded computing resources proposal.

2022, subject matter expert reviewer in a NASA peer review.

2018, subject matter expert reviewer for a publication in *MNRAS* journal.

TEACHING EXPERIENCE

Guest Lecturer, Energy and Gas in Interstellar Space, Graduate Course, Cardiff University, Instructor Dr. Tim Davis (Spring semester 2024, 2025)

Co-Instructor, Introduction to Astrophysics, Undergraduate course, Cardiff University, Co-teaching with Dr. Mathew Smith (Spring semester 2023, 2024)

Teaching Assistant, Electricity, Magnetism and Optics, Undergraduate course, IISc, taught by Dr. Tarun Deep Saini. (January - April, 2015)

Teaching Assistant, Fluids and Plasma, Graduate course, IISc, taught by Prof. Prateek Sharma. (August - November, 2014)

MENTORING EXPERIENCE

Kobe Richards (Cardiff University), co-Mentoring, annual project, School of Physics and Astronomy, Cardiff University (September 2024 - May2025)

Sebastian Lacayo (Florida International University), co-mentoring, ACRES 2019 summer program, CMSE Department, Michigan State University (May-July 2019)

MAJOR COLLABORATIONS

Feedback and Energetics from Magnetized AGN Jets collaboration at Michigan State University, US (2023 - ongoing).

Figuring Out Gas & Galaxies in Enzo (FOGGIE) collaborations at Space Telescope Science Institute, US (2019-2022)

PROGRAMMING EXPERIENCE

Fortran77/95, C, C++, Python, Matlab, MPI

Research experience with Zeus-MP, Pluto, Enzo, AthenaPK and Arepo HD/MHD codes.

Experience of working on XSEDE, NASA, MSU, IISc and SCW high performance computing facilities.

Co-developer of Enzo code - mainly with implementing AGN feedback using “Active Particle” formulation.

Co-developer of PLUTO code - mainly with developing AGN feedback and Runge-Kutta-Legendre super-time-stepping method for implementing anisotropic thermal conduction.

PRESENTATIONS

Important conference presentations

Environmental effects on Black Hole Feedback Valve in Massive Galaxies, Resolving Galaxy Ecosystems Across All Scales, The Chinese University of Hong Kong, Hong Kong, December 2023. (**TALK**)

Environmental effects on Black Hole Feedback Valve in Massive Galaxies, 6th ICM Theory and Computation Workshop, Neils Bohr Institute, Copenhagen, Denmark, August 2022. (**TALK**)

AGN and Stellar Feedback in Galaxy Clusters, ASTRONUM-2019, Paris, France, July 2019 (**TALK**)

Role of BCG and AGN-driven Turbulence in Galaxy Cluster Evolution, SnowCluster - The Physics of Galaxy Clusters, Snowbird, Utah, US, March 2018 (**TALK**)

AGN Feedback in Galaxy Groups, The Physics of Groups and Galaxy Properties therein meeting, Institut d'Astrophysique de Paris (IAP) Paris, France, December 2016 (**TALK**)

Other important presentations

Environmental effects on Black Hole Feedback Valve in Massive Galaxies, Department of Physics, Indian Institute of Science, Bangalore, October 2022 (**COLLOQUIUM**)

Cool Core Cycles - AGN Feedback in Galaxy Groups and Clusters, Inter-University Centre for Astronomy and Astrophysics, Pune, September 2022 (**COLLOQUIUM**)

Cool Core Cycles - AGN Feedback in Galaxy Groups and Clusters, Department of Astronomy and Astrophysics, Tata Institute of Fundamental Research, Mumbai, September 2022 (**COLLOQUIUM**)

Environmental dependence of self-regulating black hole feedback in massive galaxies, HALO 2021, KITP, US, January-March 2021 (**SHORT VIDEO**)

Environmental effects on Black Hole Feedback Valve in Massive Galaxies, Astro Group Meeting, Centre for Computational Astrophysics, Faltiron Institute, October 2020 (**TALK**)

The Feedback Loop : Controlling cooling flows in galaxy clusters, Physics and Astronomy, Astronomy Colloquium, University of Notre-Dame, US, December 2018 **(COLLOQUIUM)**

REFERENCES

Mark Voit
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PUBLICATIONS

Lead Author Publications

XMAGNET : Kinetic, Thermal and Magnetic AGN Feedback in Massive Galaxies at Halo Masses~$10^{13.5}$ $M_{\odot}$
Deovrat Prasad, Philipp Grete, Brian O'Shea, Forrest Glines, Mark Voit, Freeke van de Voort, Martin Fournier, and Ben Wibking, 2026, MNRAS, 545,1-18

The Case for Hot-Mode Accretion in Abell 2029
Deovrat Prasad, Mark Voit and Brian O'Shea, 2024, MNRAS, 531, 259

Atmospheric Circulation in Simulations of the AGN-CGM Connection at Halo Masses ~ $10^{13.5}$ $M_{\odot}$
Deovrat Prasad, Mark Voit and Brian O'Shea, 2022, ApJ, 932, 18

Environmental Dependence of Self-Regulating Black-hole Feedback in Massive Galaxies
Deovrat Prasad, Mark Voit, Brian O'Shea, and Forrest Glines, 2020, ApJ, 905, 50

Cool-Core Cycles and Phoenix
Deovrat Prasad, Prateek Sharma, Arif Babul, Mark Voit and Brian O'Shea, 2020, MNRAS, 495, 594

Cool-Core Clusters : Role of BCG, Star Formation & AGN-Driven Turbulence
Deovrat Prasad, Prateek Sharma, and Arif Babul 2018, ApJ, 863, 62

AGN jets driven stochastic cold accretion in cluster cores
Deovrat Prasad, Prateek Sharma, and Arif Babul, 2017, MNRAS, 471, 1531

Cool core cycles: Cold gas and AGN jet feedback in cluster cores
Deovrat Prasad, Prateek Sharma, and Arif Babul, 2015, ApJ, 811, 108

Other Publications

XMAGNET: Velocity structure functions of AGN-driven turbulence in the multiphase intracluster medium
Martin Fournier, Philipp Grete, Marcus Brüggen, Brian W. O'Shea, **Deovrat Prasad**, Benjamin D. Wibking, Forrest W. Glines, and Rajshekhar Mohapatra, 2025, A&A, 698, A121

The XMAGNET Exascale MHD simulations of SMBH feedback in galaxy groups and clusters: Overview and preliminary cluster results
Philipp Grete, Brian W. O'Shea, Forrest W. Glines, **Deovrat Prasad**, Benjamin D. Wibking, Martin Fournier, Marcus Brüggen, and G. Mark Voit, 2025, ApJ, 988, 155

A Black-Hole Feedback Valve in Massive Galaxies
G. Mark Voit, Greg L. Bryan, **Deovrat Prasad**, Rachel Frisbie, Yuan Li, Megan Donahue, Brian W. O'Shea, Ming Sun, and Norbert Werner, 2020, ApJ, 899, 70

Figuring Out Gas & Galaxies In Enzo (FOGGIE). IV. The Stochasticity of Ram Pressure Stripping in Galactic Halos
Raymond C. Simons, Molly S. Peeples, Jason Tumlinson, Brian W. O'Shea, Britton D. Smith, Lauren Corlies, Cassandra Lochhaas, Yong Zheng, Ramona Augustin, **Deovrat Prasad**, Gregory F. Snyder, and Erik Tollerud, 2020, ApJ, 905, 167

Scalable explicit implementation of anisotropic diffusion with Runge-Kutta-Legendre super-time-stepping
Bhargava Vaidya, **Deovrat Prasad** Andrea Mignone , Prateek Sharma , Luca Rickler, 2017, MNRAS , 472, 3147

Decadal Survey White Paper 2020

Circumgalactic Gas and the Precipitation Limit

G. M. Voit, A. Babul, Iu. Babyk, G. L. Bryan, H.-W. Chen, M. Donahue, D. Fielding, M. Gaspari, Y. Li, M. McDonald, B. W. O'Shea, **D. Prasad**, P. Sharma, M. Sun, G. Tremblay, J. Werk, N. Werner, and F. Zahedy, 2019, arXiv:1903.11212

In preparation

Cold-mode AGN feedback in cosmological simulations

Deovrat Prasad, and Freeke van de Voort, 2026 (To be submitted soon for publication)

Complete list of papers can be accessed on :

https://ui.adsabs.harvard.edu/public-libraries/oczDkRSgS4uJgMWUz63qyg