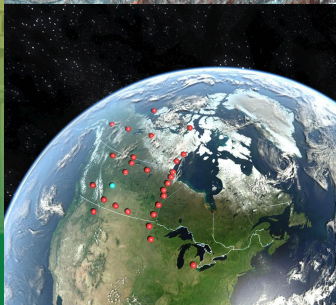
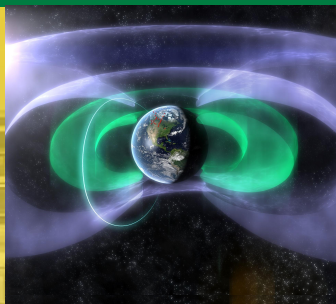


SPACE AND PLASMA PHYSICS



UALBERTA
PHYSICS

Space Physics involves the study of charged particles and magnetic fields in the invisible realms above and beyond the atmospheres of planets. It includes the study of the Sun's corona, the ionosphere and magnetosphere of planets, the heliosphere, and the local interstellar medium. The ultimate challenge of space physics is to understand the physical concepts behind space weather and to someday be able to accurately predict it.

Plasma Physics is an important field of study in many research activities at the University of Alberta. Plasmas are central in the physics of magnetic and inertial confinement fusion experiments. Their dynamics are key in many laser processes and applications, including laser wakefield particle acceleration. They are also ubiquitous in our near-space and cosmic environment.



Abigail Azari, Assistant Professor

Space Physics and Planetary Science, Machine Learning and Statistical Methods

Dr. Azari and her research group aim to develop the use of machine intelligence for scientific discovery for planetary science and space physics. This focuses on addressing outstanding challenges in uncertainty quantification and the inclusion of physical information. These challenges are broadly shared between scientific domains and Dr. Azari's research group centers on probabilistic machine learning and inverse problems. Dr. Azari is also a Canada CIFAR AI Chair and a research Fellow at the Alberta Machine Intelligence Institute.

aazari@ualberta.ca | abbyazari.github.io

Ian Mann, Professor

Experimental & Theoretical Space Physics

Dr. Mann's research focuses on understanding solar-terrestrial coupling, specifically the excitation of global scale waves in near-Earth space, and understanding the dynamics of the Van Allen radiation belts. In partnership with CSA, ESA and NASA, he uses satellite and ground-based data interpreted in appropriate theoretical frameworks to assess energy transport through the coupled geospace system, including space weather effects and coupling to the atmospheric climate system.

ian.mann@ualberta.ca | www.carisma.ca
<https://sites.ualberta.ca/~imann>



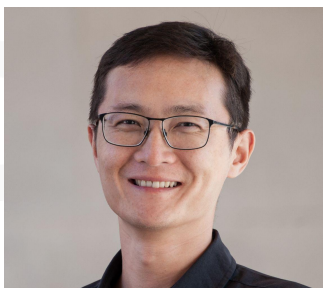
Wojciech Rozmus, Professor

Theoretical & Computational Plasma Physics

Dr. Rozmus studies theoretical and computational plasma physics, the goal of which is to achieve quantitative understanding of nonlinear, many body processes in ionized gases often out of equilibrium. He has contributed to the development of theoretical and numerical methods in plasma theory, with emphasis on nonlinear phenomena, transport and kinetic theory, which have been applied in the interpretation of plasma laboratory experiments, with particular attention to laser plasma interaction experiments.

wrozmus@ualberta.ca





Yangyang Shen, Assistant Professor
Space Plasma Physics & Space Weather

Dr. Shen's research focuses on understanding wave-particle interactions in terrestrial and planetary magnetospheres and ionospheres, and particle acceleration processes that drive aurora and radiation belt dynamics. He combines satellite and ground-based observations with numerical simulations to uncover the fundamental physical processes governing the magnetosphere-ionosphere-atmosphere coupling system. His work aims to improve our ability to predict solar-driven disturbances in near-Earth space environment, and to mitigate space weather risks on space- and ground-based infrastructure.

yangyang.shen@ualberta.ca

Richard Sydora, Professor
Energy Conversion & Nonlinear Processes in Plasmas

Dr. Sydora's research focuses on energy conversion and nonlinear processes in plasmas, physics of reconnecting magnetic fields, particle acceleration in plasmas: lasers, nonlinear plasma waves, turbulence and transport in plasmas, and kinetic plasma simulation: particle and Vlasov methods.

rsydora@ualberta.ca



Additional researchers in Space Physics include:

Darcy Cordell, Adjunct Professor
dcordell@ualberta.ca

Andy Kale, Faculty Service Officer
akale@ualberta.ca



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Office of Graduate Studies - Physics
physgradprogram@ualberta.ca
(780) 492-6219