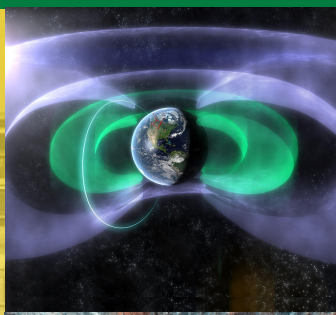
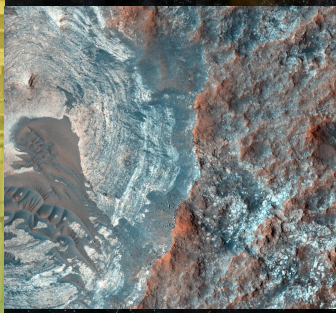
SPACE AND PLASMA PHYSICS





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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.

Ian Mann, Professor
Experimental & Theoretical Space Physics

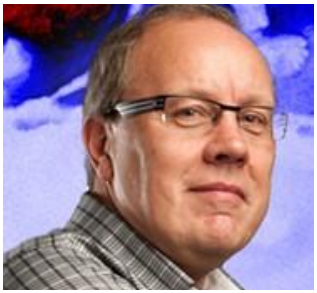
Dr. Mann's research focuses on understanding solar-terrestrial coupling, specifically the excitation of global scale waves in near-Earth space, and understanding the dynamics of the Van Allen radiation belts. In partnership with CSA, ESA and NASA, he uses satellite and ground-based data interpreted in 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

Richard Marchand, Professor
Computational Physics

The Marchand group studies computational physics, the physics of spacecraft interaction with space environment, ionospheric and magnetospheric physics, particle in cell (PIC) simulations, finite elements, and structured and unstructured meshes.

richard.marchand@ualberta.ca |
https://sites.ualberta.ca/~rmarchan



Robert Rankin, Professor
Plasma Waves

Dr. Rankin's research focuses on determining the role played by plasma waves in transferring electromagnetic energy and particles from the solar wind to Earth's magnetosphere (the geomagnetic plasma-filled cavity around Earth) and polar ionosphere. This includes the study of ULF waves in complex magnetic topologies, and wave-particle interactions affecting energetic particle populations in auroral plasma and in the Van-Allen radiation belts.

rrankin@ualberta.ca

Wojciech Rozmus, Professor
Theoretical & Computational Plasma Physics

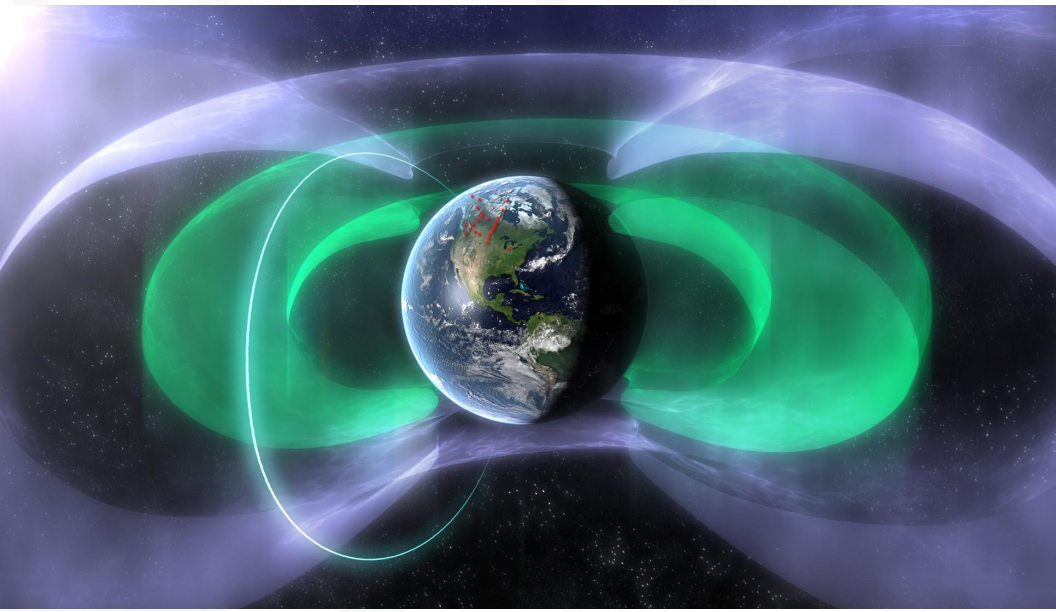
Dr. Rozmus studies theoretical and computational plasma physics, the goal of which is to achieve quantitative understanding of nonlinear, many body processes in ionized gases often out of equilibrium. He has contributed to the development of theoretical and numerical methods in plasma theory, with emphasis 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

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



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Office of Graduate Studies - Physics
physgradprogram@ualberta.ca
(780) 492-5286

ualberta.ca/physics