Special Issue

Astrophysical Magnetohydrodynamics, Plasma Physics and Cosmic Rays

Message from the Guest Editors

This Special Issue brings together state-of-the-art research at the intersection of astrophysical magnetohydrodynamics (MHD), plasma physics, and cosmic ray (CR) dynamics. The central focus is on understanding how magnetized turbulence and plasma processes shape the structure, dynamics, and energetic phenomena across a wide range of astrophysical environments—from the interstellar and circumgalactic medium to galaxy clusters and beyond. The scope of this issue is intentionally broad, aiming to reflect the diversity and interdisciplinarity of the field. Topics of interest include, but are not limited to, the following:

- Theoretical, numerical, and observational studies of MHD turbulence and instabilities;
- Magnetic reconnection in both collisional and collisionless plasmas;
- Multi-phase plasma dynamics and the interplay between ionized and neutral components;
- Plasma processes in star formation, cosmic structure formation, and galaxy evolution;
- Transport, acceleration, and confinement of cosmic rays in turbulent media;
- Development and application of novel diagnostics for magnetic fields and plasma conditions.

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About the Journal

Message from the Editorial Board

Galaxies provides an advanced forum for studies related to astronomy, astrophysics, and cosmology, including all of their subfields. Different formats, such as specialized research articles, reviews, communications and technical notes are welcomed. Manuscripts containing original and creative research proposals and ideas are especially appreciated.

We encourage scientists to publish their astronomical observations and theoretical results in as much detail as possible. There is no restriction on the paper length and full experimental and methodological details, as applicable, should be provided. All papers will be peer reviewed promptly. On behalf of the distinguished members of the editorial board, I extend my welcome to all researchers working on these subjects to contribute to *Galaxies*.

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