

# Announcing a Special Issue of the IEEE TRANSACTIONS ON PLASMA SCIENCE on Space and Cosmic Plasma

OUR KNOWLEDGE of space and cosmic plasma is at present in such a rapid state of advancement that it is appropriate to speak of a change in paradigm. This change started 5 or 10 years ago and was precipitated by:

- a) *in situ* measurements of the properties of plasmas in the magnetospheres, leading to the confirmation of Birkeland field-aligned currents, double-layer acceleration of charged particles, magnetic flux ropes in the ionosphere of Venus, and a system of currents in the magnetospheres of Jupiter and Saturn;
- b) *discovery* of an immense, filamentary, magnetic-field aligned plasma structure at the center of our Galaxy;
- c) *laboratory experiments* duplicating the power laws of electromagnetic radiation from extragalactic sources and confirming the plasma processes responsible for the acceleration of charged particles to high energies; and
- d) the *advent* and application of multidimensional, relativistic, and fully electromagnetic particle-in-cell simulations to space and cosmic plasma.

In recognition of the growing evidence that the basic properties of plasmas are the same everywhere, the IEEE TRANSACTIONS ON PLASMA SCIENCE is devoting a Special Issue on Space and Cosmic Plasmas. It is anticipated that the subject areas of interest will include:

- Instabilities and filamentation in space and cosmic plasma,
- The origin of magnetic fields in cosmic plasma; the generation and amplification of fields in rotating astrophysical bodies,

- Electric currents in space; the formation of Birkeland current systems,
- Electric double layers; the occurrence of electric fields along magnetic-field lines,
- Charged-particle acceleration in cosmic plasma,
- Electromagnetic radiation mechanisms in cosmic plasma,
- The role of plasma and magnetic fields in galaxy formation; separation of elements,
- Laboratory astrophysics: Terrellas, pinches, dense plasma foci, and charged particle beam propagation,
- Scaling laws and the transfer of knowledge between astrophysical, auroral, and laboratory plasmas.

The goals of this Special Topic Issue are to provide an update on the progress in these areas and to report on the exchange of knowledge between plasmas of all dimensions in size hierarchy. The submission of observational, theoretical, experimental, and computational results is encouraged.

The deadline for receipt of the contributions for consideration in the Special Issue is April 1, 1986. The Special Issue is scheduled for publication in December 1986. Contributors should send three copies of the manuscript directly to the Guest Editor. Further instructions for authors may be found inside the back cover of current issues of the IEEE TRANSACTIONS ON PLASMA SCIENCE.

Anthony L. Peratt, *Guest Editor*  
Group X-8, MS-B259  
Los Alamos National Laboratory  
Los Alamos, NM 87545  
(505) 667-1574