

## **First Circular – Workshop of the International Space Science Institute (ISSI)**

23 September 2019

### **The Heliosphere in the Local Interstellar Medium**

**23-27 March 2020**

#### **Conveners**

John Richardson	M.I.T, Cambridge, MA, USA
Andrei Bykov	International Space Science Institute, Bern, Switzerland
Frederic Effenberger	GFZ, Potsdam, Germany
Klaus Scherer	Ruhr-Universität, Bochum, Germany
Rudolf von Steiger	International Space Science Institute, Bern, Switzerland
Gary Zank	University of Alabama, Huntsville, USA

#### **Local organisation:**

Alexandra Lehmann, ISSI, [alexandra.lehmann@issibern.ch](mailto:alexandra.lehmann@issibern.ch), Phone: +41 31 631 48 96

#### **Objectives and Content of the Workshop**

The initial reconnaissance of the outer heliosphere and local interstellar medium (LISM) with in situ measurements (Voyagers 1 and 2), remote sensing of energetic neutral atoms (ENAs) (IBEX and CASSINI) and hydrogen (Voyager and SOHO), and measurements of interstellar dust in the heliosphere (Ulysses) is complete. This Workshop will review the heliosphere's interaction with the LISM. The last ISSI Workshops on similar topics were "*Cosmic rays in the Heliosphere*" in April 2010 and "*From the Outer Heliosphere to the Local Bubble*" in October 2007. Since then major progress has been made. Both Voyager spacecraft crossed the heliopause boundary region and entered the LISM. Before the HP crossing, Voyager 2 observed a solar cycle of variation in the heliosheath and revealed very different plasma flows and particle variations than observed at V1. ENA measurements from IBEX and CASSINI also span nearly a solar cycle. Modeling has shown the connection between the ENA and heliosheath particles that are their source and plays major roles in studies of the heliospheric shape, instabilities, and particle distributions.

Numerous questions still remain. Is the heliospheric tail long or short? What is the role of reconnection in producing the energetic particle profiles and energies in the heliosheath? Why was the heliosheath so narrow in the V1 direction? Why are plasma flows and particle intensities in the heliosheath so different at V1 and V2? Why does the heliopause structure differ at V1 and V2? How is the IBEX ribbon formed? The Workshop will discuss these and other issues and proposed solutions.

**The purpose of this is to produce the first ISSI reference work describing the complete heliosphere, including the heliopause and the effects of the heliosphere on the LISM.** The Workshop will cover observations and modeling and highlight what has been learned and what is still not understood. Although emphasis will be on the results of the past decade, the full interaction from pickup ions to the termination shock to the LISM will be covered with the goal of making this a complete reference.

**The Workshop will cover the following main themes:**

- In situ observations
- Remote UV and energetic neutral atom observations
- Modeling of the heliosphere/LISM interaction
- The structure of the heliosphere
- Time dependence in the heliosphere
- Future directions for observations and modeling.

Short presentations by the chapter leads or a designated chapter co-author attending are foreseen. All of those attending will contribute to one or more of the chapters.

**Product**

Following the Workshop, the papers will be published as a volume in the Space Science Series of ISSI by Springer, in parallel with the publication of the papers in Space Science Reviews. A total of about 8-12 review style papers, submitted to the usual refereeing process, will be published in the book. The papers will be based on talks presented at the Workshop and will reflect the discussions that will be held among the participants during the Workshop.

**Location**

The Workshop will be held at the International Space Science Institute, Hallerstrasse 6, 3012 Bern, Switzerland.

**Attendance**

This will be by invitation only with ~ 55 participants maximum including young scientists.

**Young scientists**

Under its special programme for supporting young scientists, ISSI will invite around four early career scientists, within two years of their PhD, to take part in the Workshop.

**Funding**

ISSI will provide the subsistence costs (hotel and a per diem to cover meals) to all participants but not the travel costs. There will be no registration fee for the Workshop.

**Schedule**

Invitations and First Circular:

Registration deadline:

Second Circular and final program:

Hotel deadline:

Workshop:

3<sup>rd</sup> February 2020

6<sup>th</sup> March 2020

23<sup>rd</sup>-27<sup>th</sup> March 2020