

## Special Sessions

The convenor will introduce the special session for 20 minutes providing the audience with a comprehensive overview of the scientific profiles of each of the speakers together with a brief description of the subject treated during the special session. After the convenor, five/six speakers will take the floor and will deliver talks of 25 minutes each (20 + 5 minutes for questions). The last slot (SSA6 and SSB6) can be selected by the convenors from the submitted abstracts indicating their wish to be presented as short (12 + 2 minutes for questions) contribution in any of two special sessions. The convenors will select the abstracts upon their scientific quality, novelty and suitability to the special sessions.

### Special Session 1

#### PLASMA SPACE PROPULSION

**Convenor:** Prof. E. Ahedo (Universidad Politécnica de Madrid, Spain)



Plasma propulsion of spacecraft is challenging the monopoly of chemical propulsion. The specific power that can be deposited into a plasma beam is orders of magnitude larger than the specific chemical power of known fuels. This means enormous savings in launching costs and the possibility of completing more ambitious space missions. Deep-Space-1, Smart-1, Hayabusa, Dawn, and Goce are being pioneering missions in demonstrating the success of plasma propulsion. This

constitutes nowadays a vast family of technologies, including kilowatt devices already implemented in commercial missions, microthrusters almost ready to fly, megawatt thrusters waiting for suitable on-board power sources, and numerous speculative prototypes.

Plasma processes and conditions differ widely from one thruster to another, with preeminence of magnetized, weakly collisional plasmas. Energy is imparted to the plasma via energetic electron injection, biased electrodes, or electromagnetic irradiation. Plasma acceleration can be electrothermal, electrostatic or electromagnetic. Plasma-wall interaction affects energy deposition and erosion of thruster elements, and thus is central for thruster efficiency and lifetime. Magnetic confinement and magnetic nozzles are

present in several devices. Oscillations and turbulent transport are inherent to the performances of some thrusters.

This special session will overview the state of plasma propulsion and will discuss several of the innovative technologies under current active research.

14.00 – 14.15	Convenor Introduction (Prof. E. Ahedo) / FALLA HALL
14.15 – 14.40	SSA 1
14.40 – 15.05	SSA 2
15.05 – 15.30	SSA 3
15.00 – 16.00	COFFEE
16.00 – 16.25	SSA 4
16.25 – 16.50	SSA 5
16.50 – 17.15	SSA 6

## Special Session 2

### PLASMA FLOW CONTROL AND COMBUSTION

**Convenor:** Dr. A. Starikovskiy (Princeton University, USA)



Flow control opportunities by plasma include shock wave pattern control; aerodynamic breaking; drag reduction; heat mitigation; flow vectorization, acceleration and deceleration; MHD power extraction and breaking. Boundary layer control could be subdivided into laminar-turbulent transition control; boundary layer separation control; lift and drag force control; acoustic noise control; mixing enhancement. Nonequilibrium plasma also may be very efficient in ignition and flame stabilization control; engine performance enhancement, including possibility of fast initiation of detonation waves.

Nonequilibrium plasma demonstrates great abilities to control ultra-lean, ultra-fast, low-temperature flames and becomes an extremely promising technology for a wide range of applications, including aviation GTEs, piston engines, RAMjets, SCRAMjets and detonation initiation for pulsed detonation engines.

Recent advances in plasma kinetics allow to build detailed kinetic models to predict the efficiency of different plasma mechanisms in different aerodynamic applications. It is

necessary to understand the mechanisms of plasma assisted ignition and flow control under various conditions and to simulate numerically discharge and post-discharge processes under various conditions.

Thus, kinetics of nonequilibrium plasma in chemically active gases and mechanisms of plasma interaction with gas flows are main topics of the session.

14.00 – 14.15	Convenor Introduction (Dr. A. Starikovskiy) / ANDALUCIA HALL
14.15 – 14.40	SSB 1
14.40 – 15.05	SSB 2
15.05 – 15.30	SSB 3
15.00 – 16.00	COFFEE
16.00 – 16.25	SSB 4
16.25 – 16.50	SSB 5
16.50 – 17.15	SSB 6

#### Note

Please remember that those contributors wishing to present their paper in **any of these two special sessions** are kindly asked to indicate it in the abstract submission form. The deadline for submitting abstracts is **March 1<sup>st</sup>, 2013**. When submitting the abstract, indicate if special session (oral) or poster presentation is preferred. Contributions not **accepted for special session oral presentations** will be presented as regular contributed papers in poster sessions. Contributor of accepted special session oral presentations will be invited to **submit a full paper** for a special issue of **Plasma Sources Science and Technology** (PSST). The notification of acceptance will be sent by March 15, 2013. The full paper must be submitted before **June 30<sup>th</sup>, 2013**. Submitted papers will be subject to the usual peer review process.