P 6: Invited talks II

Time: Tuesday 11:00–12:30 Location: P-H11

Invited Talk P 6.1 Tue 11:00 P-H11

Laser diagnostics on atmospheric pressure plasmas: From basic to fancy — •Volker Schulz-von der Gathen and the CRC 1316 team — Ruhr-University Bochum, Bochum, Germany

Atmospheric pressure plasmas are one of the main research topics of the CRC 1316 'Transient atmospheric pressure plasmas: From plasmas to liquids to solids'. An overlaying goals is to understand the interaction of plasmas and species either in gas or liquid form to improve e.g. plasma catalysis or in plasma medical applications. Due to the atmospheric pressure condition most of the investigated plasmas are in the mm or even sub-mm dimensions or show strongly transient behaviour. This covers micro discharges in cavities of only 100 μm dimension to pulsed ns devices in pure noble gases or with more complex molecular admixtures. This poses challenges for many diagnostics. Here we describe a set of laser diagnostics applied allowing for enough spatial and temporal resolution to yield information on the dynamics of species, fields or population densities in some exemplary jet devices. By this we cover schemes from nowadays standard techniques to examples of only recently introduced ones. We will exemplarily discuss some of the advantages and drawbacks for the various schemes involved in particular at atmospheric pressure.

Invited Talk P 6.2 Tue 11:30 P-H11

Liquid tin interaction with deuterium plasmas — •Armin Manhard, Martin Balden, Thomas Schwarz-Selinger, and Rudolf Neu — Max-Planck-Institut für Plasmaphysik, Boltzmannstr. 2, 85748 Garching, Germany

Plasma-facing components based on low-melting liquid metals such as tin are currently being investigated. They potentially alleviate some issues arising with conventional designs using solid metals (e.g., tungsten), such as embrittlement or permanent damage due to transient thermal overloading. This presentation will first briefly review the current status of the conceptual design for liquid metal divertor components (e.g., [1, 2]). It will then focus on the interaction with hydrogen isotope plasmas, which has recently been investigated by several groups of researchers (e.g., [3, 4]). In contrast to hydrogen gas, against which tin is practically inert, atoms and ions from the plasma show a considerable reactivity both with solid and liquid tin. The effects depend strongly on temperature and range from strong chemical erosion at low temperatures to growth of sponge-like structures just below the melting point. In liquid tin, the formation of gas bubbles can lead to the ejection of tin droplets as well as to the formation of large gas pockets [3, 4, 5]. Some of these adverse effects could be mitigated by containing the liquid tin in capillary porous systems (e.g., [5]).

[1] P. Rindt et al, Fusion Eng. Des. 173 (2021) 112812 [2] S. Roccella et al, J. Fusion Energy 39 (2020) 462-468 [3] A. Manhard et al, Nucl. Fusion 60 (2020) 106007 [4] W. Ou et al, Nucl. Fusion 60 (2020) 026008 [5] W. Ou et al, Nucl. Fusion 61 (2021) 066030

Invited Talk P 6.3 Tue 12:00 P-H11

Plasma jets on surfaces — •Ana Sobota — Technische Universiteit Eindhoven, Postbus 513, 5600MB Eindhoven, The Netherlands

Non-thermal atmospheric pressure plasma jets are an outstanding model in studies of the interaction of non-thermal plasmas and substrates. With their underlying physics based on streamer discharges, but featuring reproducibility in time and space, we are able to experimentally study their behaviour resolved in space and time and measure properties like electric fields and electron densities. Special interest is given in their interaction with targets of varying electrical properties, moving away from metals and into dielectrics and liquid. The talk is going to present recent studies on this topic.