

SHORT COURSES

PLASMA DIAGNOSTICS: A MULTI-PURPOSE TOOL BOX TO GET (LOW TEMPERATURE) PLASMA PARAMETERS

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Whatever its origin, nature, energy source or applications, plasma is a complex media that has been studied for more than a century. Over the last decades, the huge development of numerical tools associated with Moore's law regarding the capabilities of computers has helped researcher to go deeper in the understanding of phenomena occurring inside a plasma. At the same time, plasma applications have undergone a tremendous expansion in all fields of activity including aerospace, automotive, display, textile, waste treatment, jewelry, biomedicine and many others. As a consequence of that huge demand for plasmas, trend has moved towards new types of plasmas: smaller size, shorter lifetime, higher pressure, plasmas in liquids etc.

Facing the wide variety of low temperature plasmas, plasma diagnostics is still a challenge and investigation tools must be adjusted to take into account the particularity of each plasma source. In the case of micro- or nano-size/lifetime plasmas, the diagnostic tool box is almost empty as compared with conventional low pressure plasmas. Often, diagnostics theory should be revisited since decreasing the dimension (in time or space) down to the micro- or nano-scale can make usual theory of low pressure plasmas inappropriate.

Anyway, let's keep optimistic! The present short course aims at providing non-expert scientists an overview of plasma diagnostic tools with their corresponding theory. Besides conventional ones –

e.g. optical emission spectroscopy, electrical probes, laser assisted diagnostics, interferometry, mass spectrometry - part of the course will be devoted to special care that has to be taken with high pressure plasmas and what can be done with nanosecond ones. Few experimental concerns will be given as well.