Laser Thomson scattering*

--A personal account of this splendid technique of plasma diagnostics

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After a brief description of speaker's happy encounters with FOM over the last 35 years, he mentions about laser-aided plasma diagnostics (LAPD),[1] which he has pursued during these 35 years. He then touches on a research centre, named "Institute of Ionised Gas and Laser Research", created at Kyushu University in 1990, and one of its main functions, besides pursuing the LAPD further, had been to hold a biennial LAPD series of international symposia, which was first held in 1983 at Kyushu University.

After briefly describing a range of studies carried out at the above Institute, he then talk about laser Thomson scattering as applied to low-temperature plasmas,[2] the most productive subject among the above studies.

In recent years, low-temperature discharge plasmas with electron temperature around a few eV have been actively studied and used for fundamental discharge physics research and for industrial process applications. Here the electron density and temperature (and sometimes also the electron energy distribution function) are the most fundamental parameters that dictate the fates of these discharge plasmas and this information is of the utmost importance. Laser Thomson scattering, which had been developed for high-temperature plasmas in the early 1960s, has gained wide-spread use in the low-temperature plasma community since the late 1970s by the initiative of the present speaker and by now has matured to an established method of plasma diagnostics. Scattering diagnostic techniques for high-temperature plasmas have had to be modified to accommodate particular situations and constraints, such as laser perturbation of plasmas, low electron densities and the presence of material surfaces near to the plasmas. In this talk, after starting from a basic description of the technique, some of the most salient results are outlined, which would not have been obtained without it, in discharges ranging from high-pressure to low-pressure gases, and near to material surfaces.

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1) Muraoka K and Maeda M 2001 *Laser-Aided Diagnostics of Plasmas and Gases* (Bristol, IOP Publishing)

2) Muraoka K and Kono A 2011 *J. Phys. D: Appl. Phys.* **44** 043001