

Forty years (1983-2023) with LAPD and for its future evolution

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“How about having a meeting in the laser diagnostics of plasmas?” was a remark of a man. Then another man replied “It sounds interesting”. This was one of those casual conversations between myself (KM) and David Evans (DE) at the counter of Chikae live-fish restaurant in the central Fukuoka in September 1983, and it has turned out to have become the beginning of the by now prestigious LAPD symposia! DE was then a visiting fellow from UKAEA Culham Laboratory in England to KM’s lab at Kyushu University for three months. Both KM and DE had subsequently contacted active researchers in the field, and Hans-Joachim Kunze (Bochum Univ) and Frieder Döbele (Essen Univ) from Germany, and Alan DeSilva (Univ Maryland, USA) agreed to come, along with about 30 participants from inside Japan. As one sees, the meeting modestly started, with the title of ‘Kyushu International Symposium on Laser-Aided Plasma Diagnostics’. The meeting produced much interactions, resulting in the unanimous proposal at the end of the meeting to hold a similar one every other year, and DE volunteered to host it at a college in Oxford Univ in 1985. Naturally, many experienced plasma diagnosticians from around the world, in particular from UK such as Nick Peacock from Culham, came to this meeting, which was subsequently called as ‘2nd International Symposium on Laser-Aided Plasma Diagnostics’. Among the participants at the 2nd meeting, Neville Luhmann from UCLA agreed to organize the 3rd meeting around his vicinity in California. There, it was decided to hold the 4th meeting again in Kyushu. After around the world, the 4th meeting attracted about 80 participants from around the globe, and everybody agreed that this might be a good rotation from Japan, Europe and USA in every other year, with the optimum size of around 80 participants due to face-to-face interactions with sufficient times for discussion. All subsequent LAPDs have been carried out in these formats, except for special cases, such as the recent postponements due to the COVID pandemic.

From the outset of the meeting, it has been a tacit understanding among the LAPD proponents that “cross-fertilizations” (CF) with other fields of physics and chemistry have to be cultivated for the LAPD meetings to have any impact/*raison d’être* in the scientific community, because various phenomena associated with LAPD, such as transmission, refraction, reflection and scattering of lasers have been established for a long time via theories of electromagnetic radiations in plasmas and no further expansion of science looked to be foreseen. Therefore, it was thought as essential to have good contacts with other fields of science to yield very essential outputs from LAPD, without which good progresses in the respective areas would not be possible. The present speaker hopes to show such examples from results of his group in low-temperature plasmas. These include laser Thomson scattering in discharge plasmas (CF with electrical engineering, laser science and semiconductor fabrication) and laser induced fluorescence to detect the temporal evolution of surface modification (CF with surface science). In addition, more recent on-going work of laser Thomson scattering is touched upon with respect to the laser-produced plasma for the EUVL (extreme ultra-violet lithography) light source (CF with semiconductor fabrication). It is the speaker’s sincere hope that completely new CFs may be heard at the present and future LAPD meetings, such that both LAPD and related fields both flourish by LAPD’s providing otherwise unobtainable information.

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