

ELECTRIC FIELD MEASUREMENTS IN PLASMAS USING SECOND HARMONIC GENERATION

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Résumé

Electric field induced second harmonic generation, or E-FISH, is a laser based diagnostic which has recently been re-purposed for the measurement of electric fields in plasmas [1]. This method involves probing a non-polar gas sample with laser light, and quantifying its second harmonic response to an externally applied electric field that is to be measured. This second harmonic signal varies proportionally with the applied field strength squared, and is otherwise absent if no field is imposed. Calibration may be performed in a known electrostatic field so as to obtain absolute field information, for instance in a plasma.

In this talk, I will present some recent electric field measurements in a fast ionization wave discharge made using picosecond E-FISH, prospects for performing E-FISH using nanosecond laser sources, and finally, describe ongoing attempts to measure surface electric fields using E-FISH.

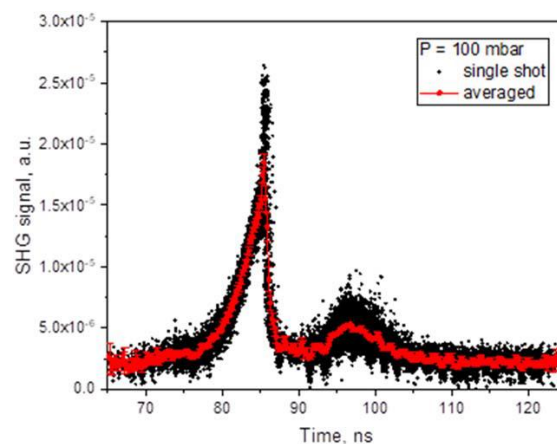


Figure 1. Time-resolved electric field measurements obtained using E-FISH for a 100 mbar, N₂ fast ionization wave discharge.

Références

- [1] Goldberg, B. M., Chng, T. L., Dogariu, A., & Miles, R. B. (2018). Electric field measurements in a near atmospheric pressure nanosecond pulse discharge with picosecond electric field induced second harmonic generation. *Applied Physics Letters*, 112(6), 064102.