

# **Modified laser-induced fluorescence-dip spectroscopy in Xenon for measuring a weak electric field distribution at the edge of electron emission plasma**

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## **ABSTRACT**

A non-invasive optical method, LIF-DIP spectroscopy [1], for measuring the weak electric field distribution at the edge of the cathode plasma of an electron accelerator will be presented. The diagnostics were adapted to obtain the space-resolved electric field distribution within one measurement. This enables reliable results for systems with low pulse-to-pulse reproducibility. The core of the measurement technique is a tuneable dye laser with a bandwidth of about 1 nm, which is used for resonant excitation of the Rydberg level in Xenon. The spectral width of the laser covers the variation of the electric field from a few hundred V/cm up to a few kV/cm. The calibration of the diagnostics was performed at a test standard with quasi-static electric field. The results agree with the calculations of the Stark splitting of Xe ns and nd levels.

## **References**

[1] U.Czarnetzki, D.Luggenhölscher, and H.F. Döbele. Phys. Rev. Lett. 81, 4592 (1998).

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