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Guillaume Lombardi, Stéphane Béchu

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Cylindrical SDBD of well-defined expansion area for standardized studies



K. Giotis^{1,2}, P. Svarnas¹, M. Mitrou^{1,3}, K. Gazeli², G. Lombardi² and S. Béchu³



UNIVERSITY OF PATRAS
ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΑΤΡΩΝ

¹University of Patras, Electrical & Computer Eng. Dept., High Voltage Lab., 26 504 Rion, Patras, Greece

²Université Sorbonne Paris Nord, LSPM, CNRS, 8 UPR 3407, F-93430 Villetaneuse, France

³Université Grenoble Alpes, Grenoble INP (Institute of Engineering), LPSC-IN2P3, 38000 Grenoble, France



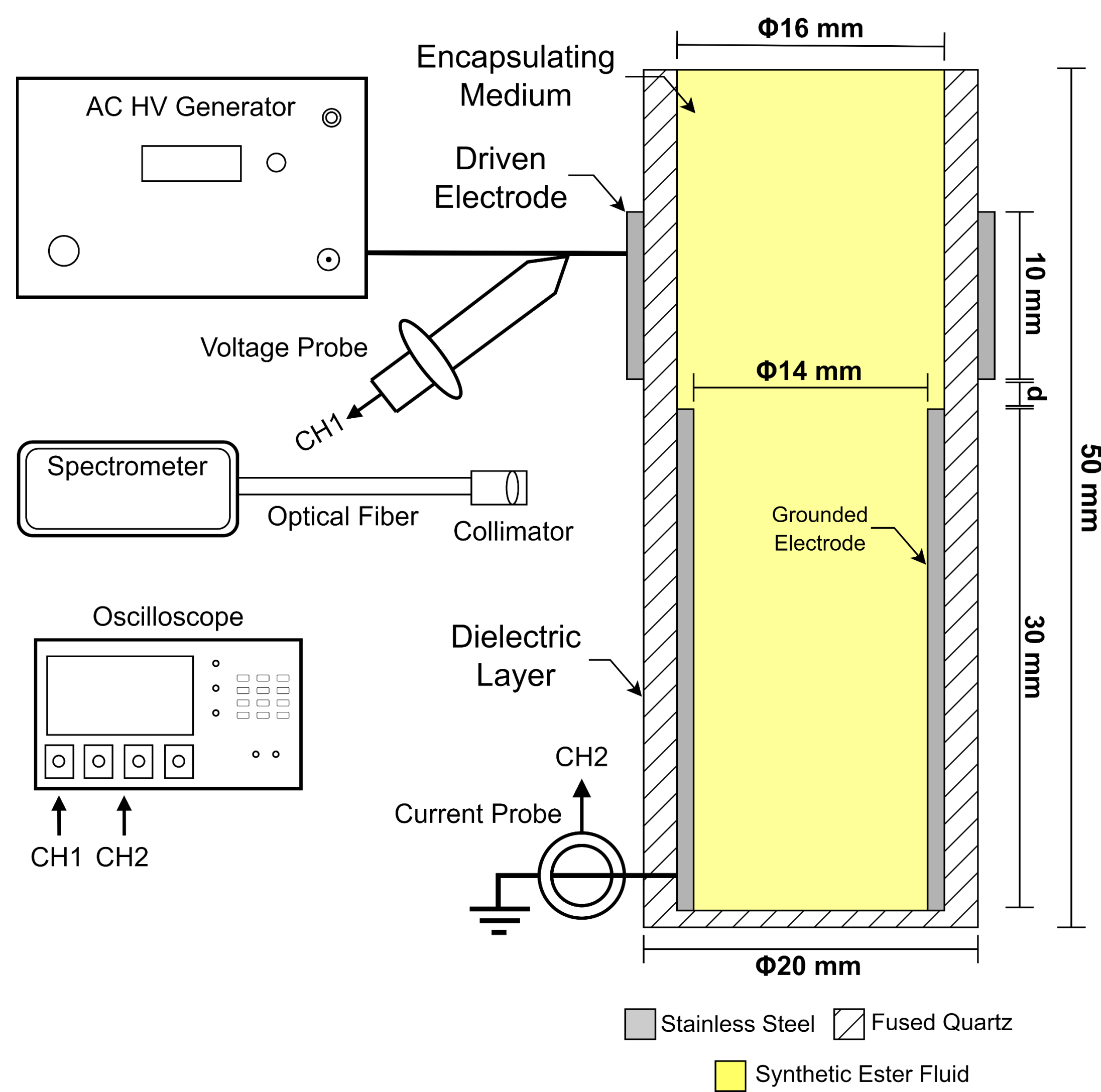
The present work lies in the field of atmospheric-pressure surface dielectric-barrier discharges (SDBDs).

A tailored experimental cylindrical setup is presented, by which the SDBD expansion area is well defined, avoiding any underside discharge. Preliminary electrical and optical emission results are reported.



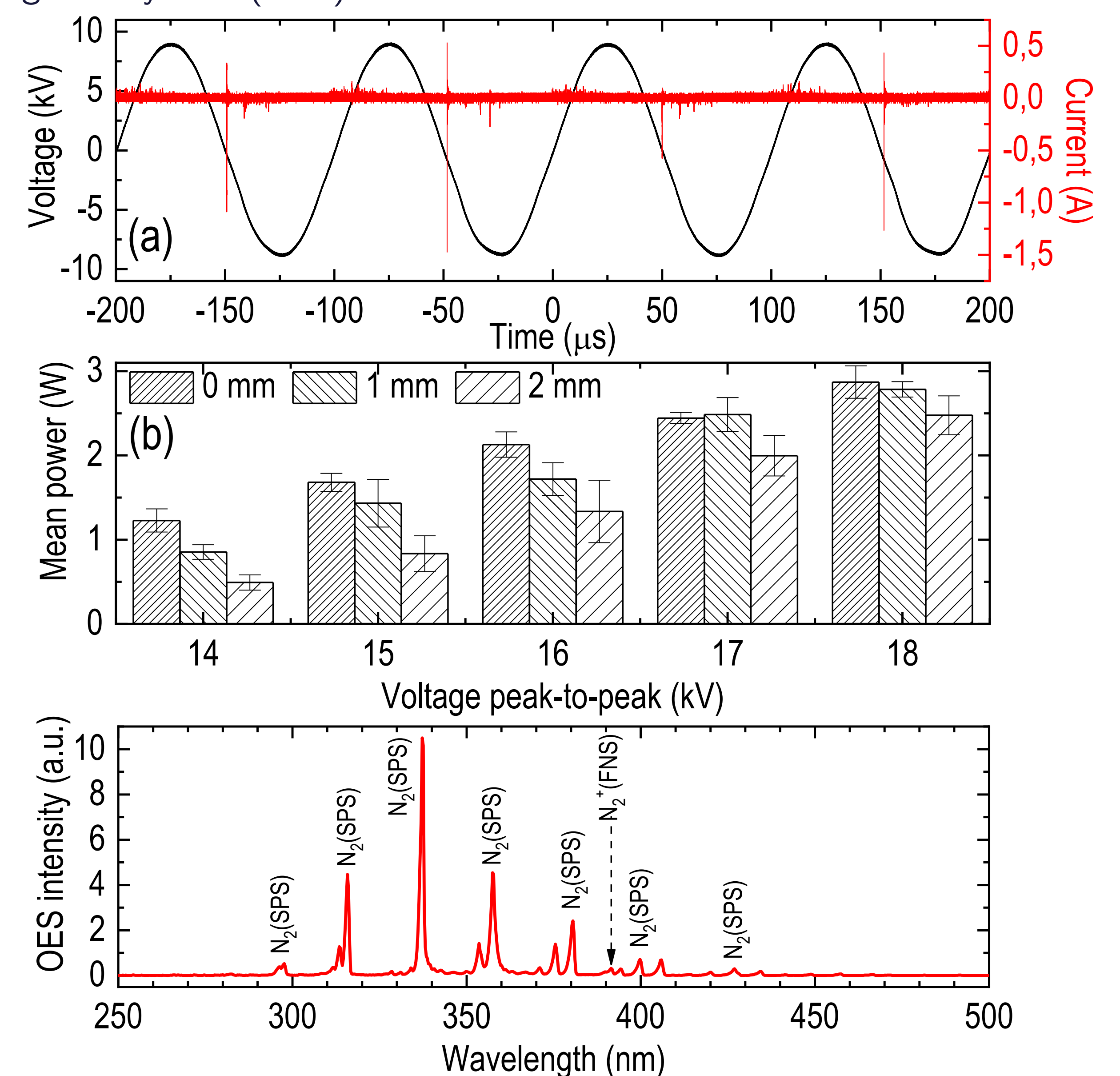
Experimental Setup

- SDBD reactor designed in a cylindrical configuration.
- The use of oil with high dielectric strength fully encapsulates the grounded electrode and an underside-discharge-free SDBD is considered.
- Appropriate for fundamental and standardized studies.
- Power measurements based on the mean value of current and voltage product.
- Relative calibrated UV-NIR optical emission spectroscopy (OES) for species investigation.

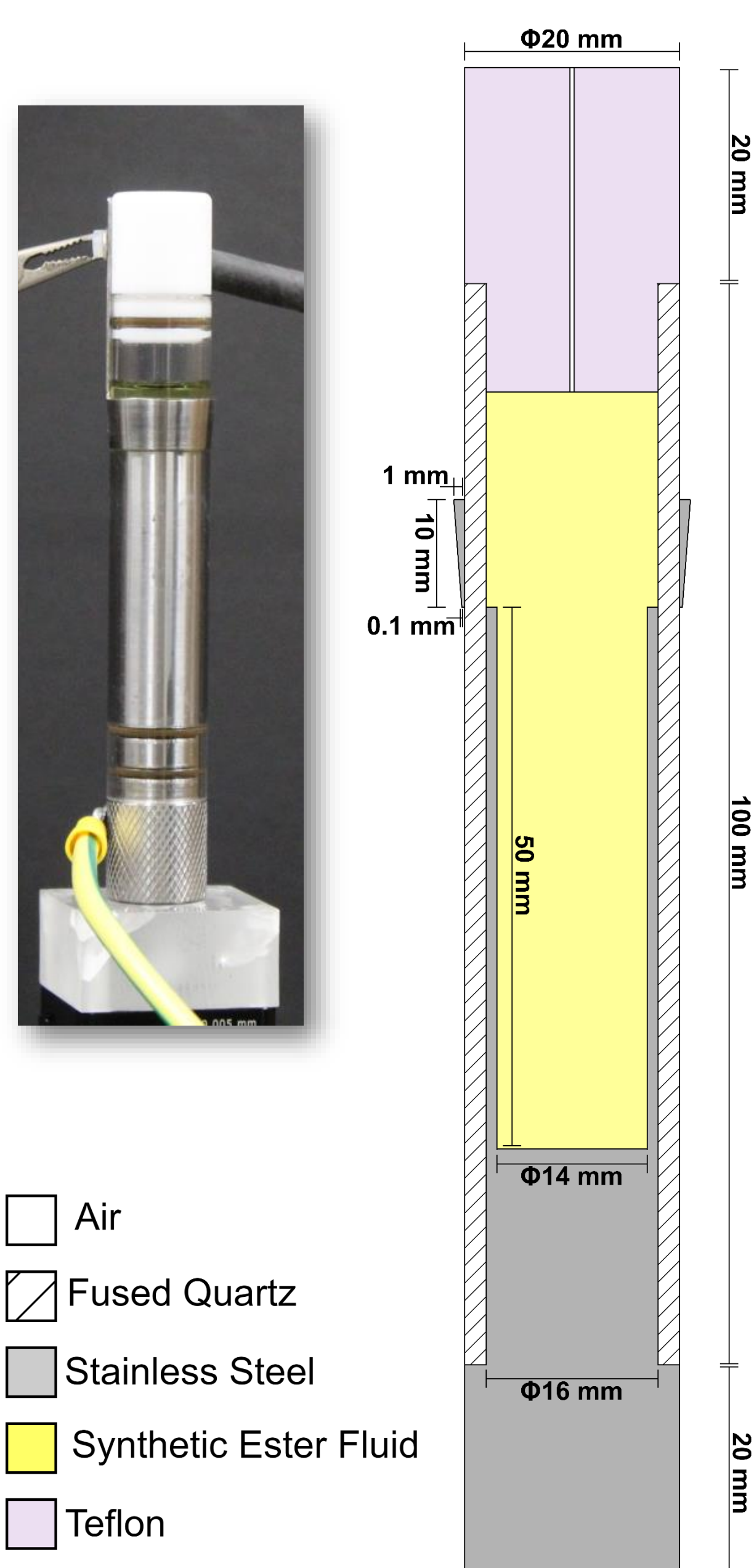


Results

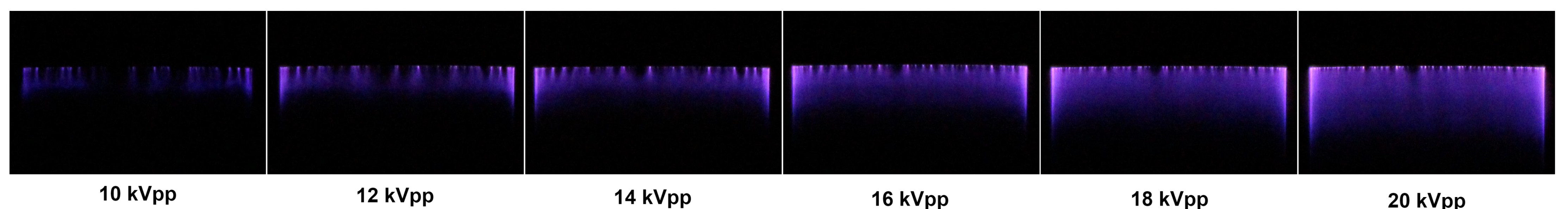
- The mean power increases non-linearly as a function of the voltage level.
- Wider gap weakens the discharge for a given applied voltage, and lower power is thus consumed.
- Detected emissive species: N₂ second positive system (SPS) and N₂⁺ first negative system (FNS).



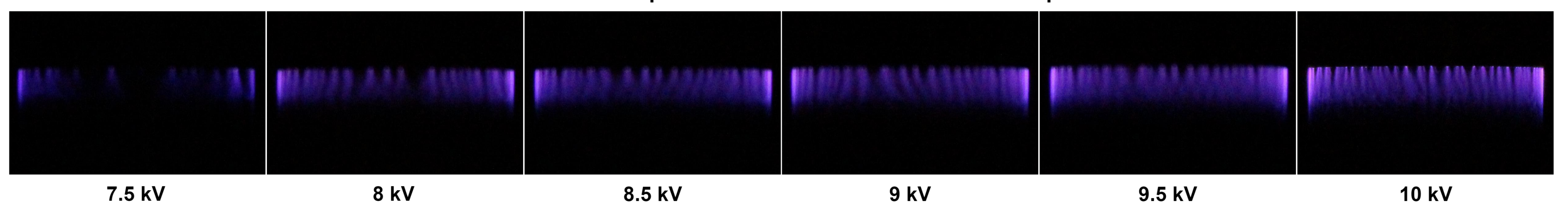
Ongoing Research



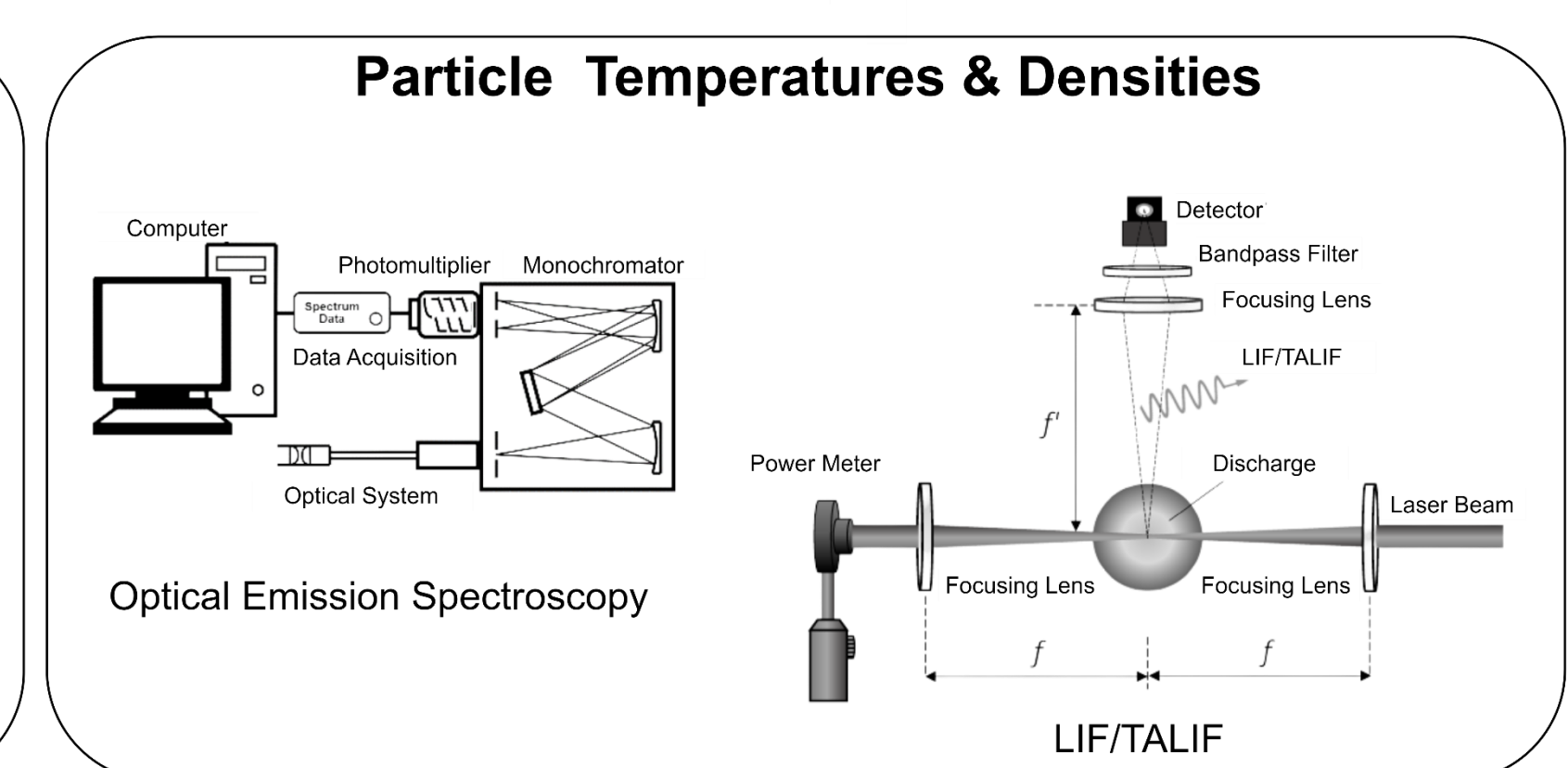
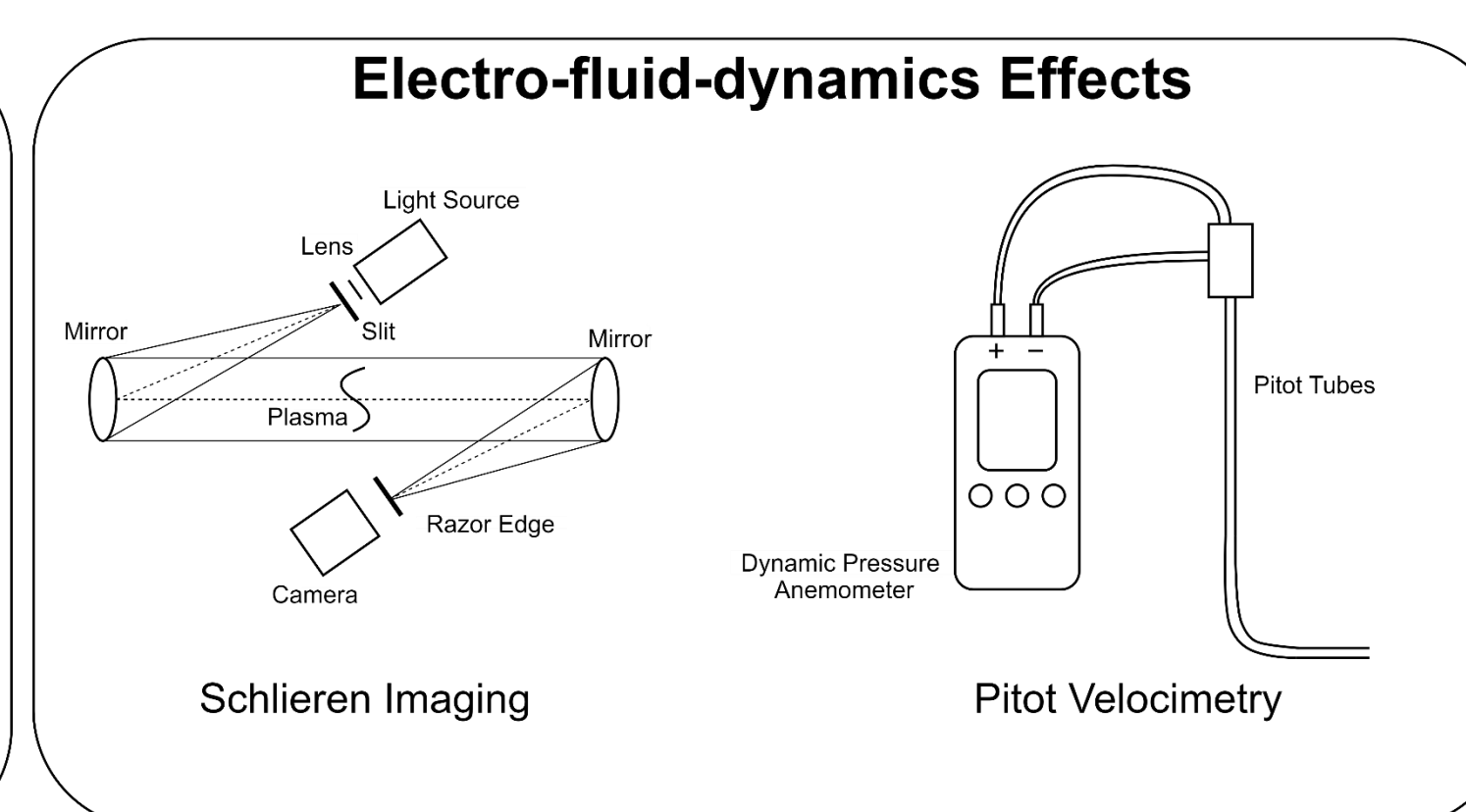
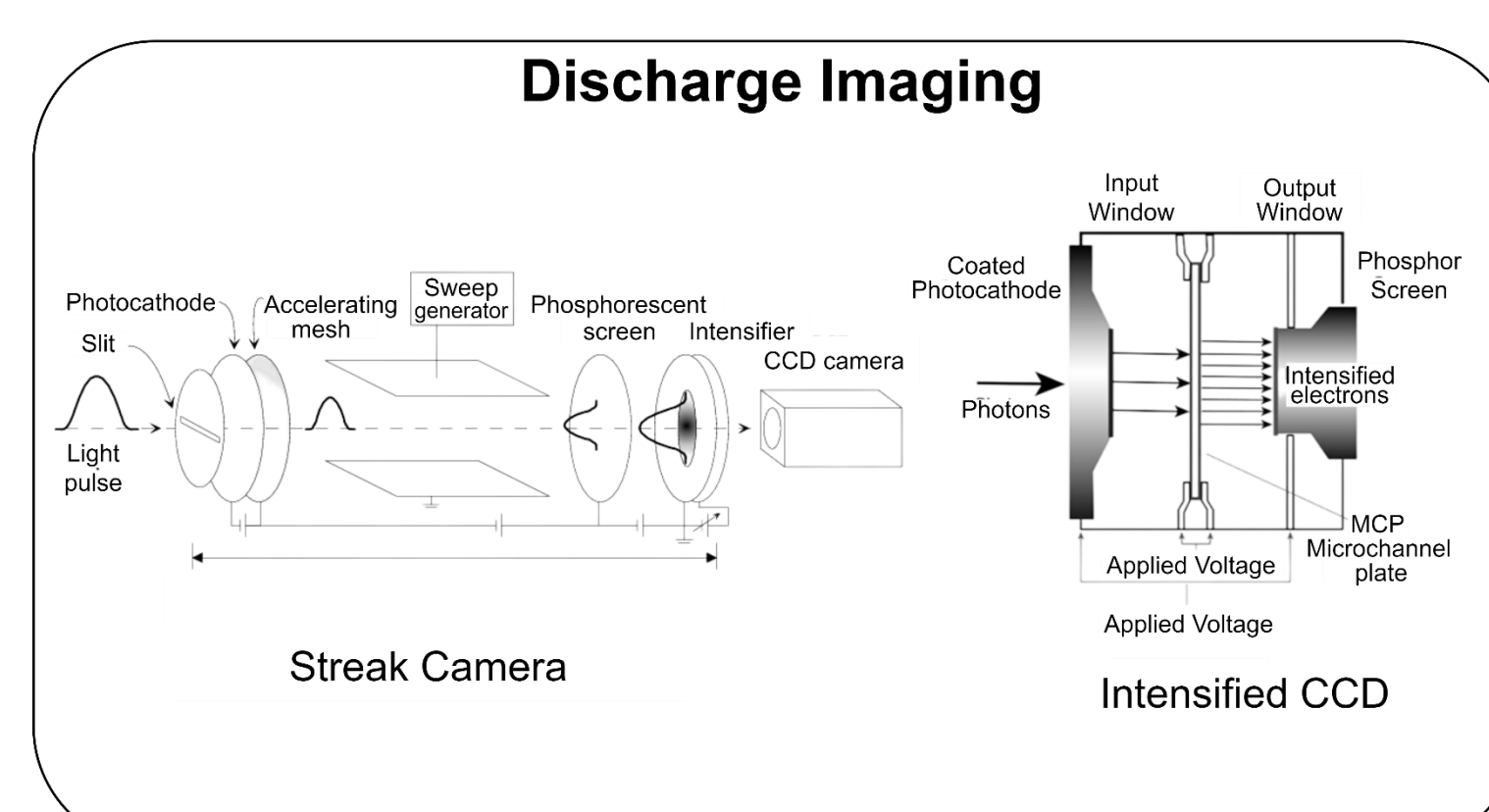
AC Sinusoidal; 10 kHz



Positive Squared Pulsed; 10 kHz; 1 μs



AC vs Pulsed



kgiotis@ece.upatras.gr
svarnas@ece.upatras.gr
mitrou@lpsc.in2p3.fr

kristaq.gazeli@lspm.cnrs.fr
guillaume.lombardi@lspm.cnrs.fr
bechu@lpsc.in2p3.fr

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