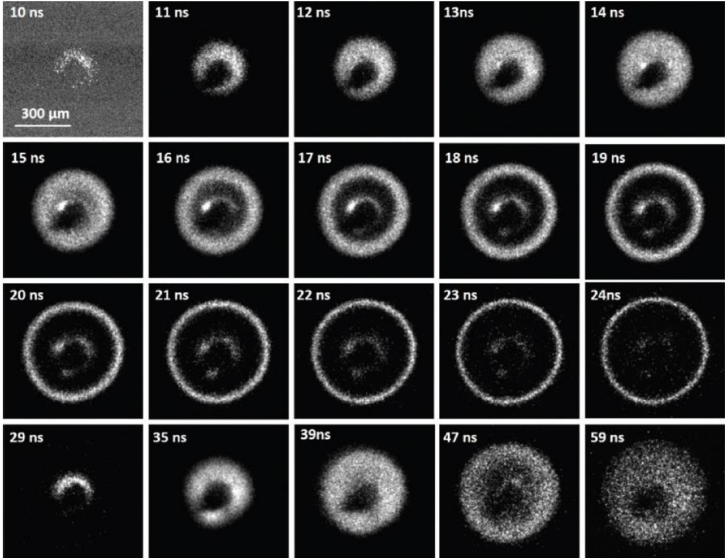


Title : Ionization waves at a plasma-semiconductor interface		
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Research Area: Primary field : Lasers and Plasma Physics Secondary field : Materials Science		
Methods: Atmospheric-pressure plasmas, surface plasmas, nanosecond discharges, plasma diagnostics (e.g. optical emission spectroscopy, electric field-induced second harmonic generation, Thomson scattering), materials chemistry diagnostics (e.g. Raman and photoluminescence spectroscopy)		
<p>PhD track subject:</p> <p>Plasma-surface interaction is a key element of the physics of numerous types of plasmas. For non-equilibrium plasmas, in which the temperature is much higher for electrons than for atoms and molecules, one common phenomenon is surface ionization waves (IW). New interactions may emerge with the use of complex materials instead of bulk metals/dielectrics as electrodes or propagation surfaces. In particular, photoelectric effects related to semiconductors can homogenize IW propagation along surfaces based on silicon-on-insulator (SOI) technology routinely used in microelectronics. Our hypothesis is that a gas-phase and electron-hole IW co-propagate adjacently along the SOI interface.</p>		
		
<p>Propagation of an IW on a SOI surface: time-resolved images obtained using a fast camera</p>		
<p>References:</p> <p>[1] Darny, T., Babonneau, D., Camelio, S., & Pai, D. Z. (2020). Uniform propagation of cathode-directed surface ionization waves at atmospheric pressure. <i>Plasma Sources Science and Technology</i> 29, 065012</p> <p>[2] Pai, D. Z., Pailloux, F., & Babonneau, D. (2019). In situ Raman spectroscopy of nanostructuration by surface plasmas generated on alumina thin film-silicon bilayers. <i>Plasma Sources Science and Technology</i>, 28(8), 085007</p>		