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Diagnostics of transient non-equilibrium atmospheric pressure plasmas¹

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Atmospheric pressure plasmas have received a renewed interest in last decades for a variety of applications ranging from environmental remediation, material processing and synthesis to envisioned medical applications such as wound healing. While most low pressure plasmas are diffuse, atmospheric pressure plasmas are often filamentary in nature. The existence of these filaments is correlated with strong gradients in plasma properties both in space and time that can significantly affect the plasma chemistry. As these filaments are often randomly appearing in space and time, it poses great challenges for diagnostics often requiring the stabilization of the filament to study the in situ plasma kinetics. In this contribution, diagnostics of a stabilized nanosecond pulsed plasma filament in a pin-pin geometry and a filament in a nanosecond pulsed atmospheric pressure plasma jet will be presented. We will focus on electron kinetics and OH and H radical production in water containing plasmas. The extension of these diagnostics to plasmas in liquids will also be discussed.

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