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Design and characterization of an RF excited micro atmospheric pressure plasma jet for reference in plasma medicine¹

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Over the last decade a huge variety of atmospheric pressure plasma jets has been developed and applied for plasma medicine. The efficiency of these non-equilibrium plasmas for biological application is based on the generated amounts of reactive species and radiation. The gas temperatures stay within a range tolerable for temperature-sensitive tissues. The variety of different discharge geometries complicates a direct comparison. In addition, in plasma-medicine the combination of plasma with reactive components, ambient air, as well as biologic tissue - typically also incorporating fluids - results in a complex system. Thus, real progress in plasma-medicine requires a profound knowledge of species, their fluxes and processes hitting biological tissues. That will allow in particular the necessary tailoring of the discharge to fit the conditions. The complexity of the problem can only be overcome by a common effort of many groups and requires a comparison of their results. A reference device based on the already well-investigated micro-scaled atmospheric pressure plasma jet is presented. It is developed in the frame of the European COST initiative MP1101 to establish a publicly available, stable and reproducible source, where required plasma conditions can be investigated. Here we present the design and the ideas behind. The presentation discusses the requirements for the reference source and operation conditions. Biological references are also defined by the initiative. A specific part of the talk will be attributed to the reproducibility of results from various samples of the device.

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