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Low Temperature Plasma: A Unique Non-Equilibrium Environment¹

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Low temperature plasmas represent a unique non-equilibrium environment composed of neutral atoms and molecules, radicals, excited states, ions and electrons. These plasmas have characteristic electron energies of a few eV and can produce highly reactive chemistry at close to ambient temperatures. These unique non-equilibrium conditions enable the delivery of highly reactive plasma species to heat sensitive surfaces and have enabled major advances in the microelectronics industry. More recently, developments at atmospheric pressure led to several emerging applications including wound healing, food decontamination, water purification and chemical and material synthesis. This talk will provide an overview of the-state-of-the-art in the field of low temperature plasmas. I will introduce the challenge of controlling plasma-interfacial interactions at atmospheric pressure. The emphasize will be on scientific advances in the understanding of interactions of plasmas with solids, liquids and living matter. This includes key findings on self-organization at interfaces and near interfacial (multiphase) species transport. The challenges for modeling and measuring the underpinning phenomena will also be highlighted.

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