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**From Photovoltaics to Hydrovoltaics: Electrical Charging on the Nanoscale.**

Date: January 16 2023, 15.00 h

Abstract: Charge separation phenomena are omnipresent in our everyday life, from the small electric shock when touching a door handle over the formation of thunderclouds to the light-driven charge separation in a solar cell. Often, the charge separation mechanisms are controlled by microscopic structures on surfaces and interfaces. Here, scanning probe microscopy (SPM) methods offer the unique opportunity to study both the nanoscale surface structure and the charging dynamics. In the presentation I will show how we use SPM and SPM-derived methods to learn about the physics of charge separation in perovskite solar cells and the spontaneous formation of high voltages in moving water droplets.