*Illumination of SrTiO3 by the UV-Radiation of the Plasma Plume during Pulsed Laser Deposition*

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Pulsed Laser Deposition (PLD) is a widely used technique to grow complex oxide films of a given stoichiometry, a complex process which is affected by a multitude of different parameters. The effect of ultraviolet radiation emitted by the plasma plume on thin film and substrate was so far a widely uncharted territory. Recent advances in the understanding of photoconductivity and the effect of UV radiation on SrTiO3 now raise the question, how the UV radiation of the PLD plasma plume affects the electrical properties of an STO substrate during pulsed laser deposition 1, 2.

STO single crystals with Pt current collectors were investigated by the means of In-Situ Impedance Spectroscopy during Pulsed Laser Deposition (IPLD). By optionally shielding the sample with a quartz disc the effect of the UV light could be isolated from potential effects of impinging species and real film growth.

Our measurements revealed an increase of the STO conductivity as a response to UV light. Combined in-plane and across-plane measurements reveal the development of a 30 times more conductive, 40 um thick, top layer in the substrate which persists after deposition. When STO is deposited on top of the crystal, the bulk conductivity shows a complex behavior, indicating that the deposition induces processes competing with the UV illumination which significantly alter the substrate stoichiometry.

1 F.V.E. Hensling et al. *UV radiation enhanced oxygen vacancy formation caused by the PLD plasma plume.*Scientific Reports 8.1 (2018): 8846*.*

² A. Viernstein et al. *High‐Temperature Photochromism of Fe‐Doped SrTiO3 Caused by UV‐Induced Bulk Stoichiometry Changes*. Advanced Functional Materials (2019): 1900196.