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The difference between electron heating and power absorption in capacitively coupled plasmas SEBASTIAN WILCZEK, JULIAN SCHULZE, RALF PETER BRINKMANN, Ruhr University Bochum, ZOLTN DONK, Wigner Research Centre for Physics, JAN TRISCHMANN, THOMAS MUSSENBROCK, Brandenburg University of Technology Cottbus-Senftenberg — Two important questions in low pressure capacitively coupled plasmas are, how do the electrons gain and loss their energy and what is a typical electron temperature? The first issue is frequently studied as electron power absorption which can be determined by the product of the electric field and the electron current density. Spatio-temporal results show that most of the power absorption is observed at the plasma sheath edge. The second question deals with the electron temperature which is determined by thermodynamics and is usually between 1 and 5 eV. However, the classical concept of the electron temperature has some limitations, because in such a low pressure regime the electron velocity distribution function is very anisotropic. In this work, a concept of a kinetic temperature is introduced which distinguishes the temperatures in different directions. This concept shows that collision events are essential in order to transfer thermal energy between the different directions. Finally, the temperature shall be linked to the electron power absorption to show that heating and power absorption are two different physical mechanisms. The presented results are obtained by means of 1D3V PIC/MCC simulations. [1] S. Wilczek et al. (2020) Journal of Applied Physics, 127(18), 181101

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