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Kinetic Model of Stochastic Heating in the INCA Discharge UWE CZARNETZKI, Ruhr Univ Bochum — A novel concept for tailored collisionless electron heating has been demonstrated experimentally for the first time [1]. A planar array of small coils generates a phase correlated vortex electric field structure with well-defined resonances in velocity space. The discharge based on this concept operates efficiently at low pressures and has the property of easy upscaling to square-meter size. The basic idea was first proposed in 2014 and studied by simulation [2]. Here, the stochastic heating mechanism is analyzed by two complementary analytical models [3]. It is shown that the heating is indeed non-local in the plane of the vortex fields but local in the vertical coordinate. The mean heating power per area, the complex conductivity, the complex damping constant, and an effective stochastic collision frequency are calculated. Conditions for effective stochastic heating are provided. In addition the role of elastic collisions is investigated. Good agreement between theory and experiment is obtained. [1] Ph. Ahr, T.V. Tsankov, J. Kuhfeld, U. Czarnetzki, submitted to PSST, arXiv:1806.02043 (2018). [2] U. Czarnetzki and Kh. Tarnev, Physics of Plasmas 21, 123508 (2014). [3] U. Czarnetzki, submitted to PSST, arXiv:1806.00505 (2018)

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