

Abstract Submitted  
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**Resonant collisionless heating in a non-uniform plasma** CONSTANTINE THEODOSIOU, Department of Physics and Astronomy, The University of Toledo, OH, 43606, OLEG POLOMAROV, Institute for Fusion Studies, The University of Texas at Austin, TX, 78712, IGOR KAGANOVICH, Plasma Physics Laboratory, Princeton University, Princeton, NJ, 08543 — The electron dynamics in low-pressure plasmas is non-local and collisionless [1]. Electron heating occurs due to resonant wave-particle interactions, namely, the transit and bounce resonances for non-magnetized plasmas and the ECR and transmission resonances for magnetized plasmas. The effects of resonances on the properties of non-uniform plasmas have been studied analytically and numerically using fast kinetic non-local approach [2]. A drastic enhancement of the power transfer into the plasma takes place at the bounce resonance if the non-uniformity of the density profile is accounted for [3]. The conditions of effectiveness of ECR and transmission resonance heating in magnetized ICP plasmas have been identified. Analytical expressions for plasma parameters to achieve the transmission resonances have been derived [4]. I. D. Kaganovich, O. V. Polomarov, C. E. Theodosiou and D. Economou. [1] *Phys. Plasmas* 11, 2399 (2004). [2] “Revisiting the anomalous rf field penetration into a warm plasma” and “Resonant effects in a non-uniform ICP plasma” submitted to special issue of *IEEE Trans. Plasma Sci.*(2005). [3] “Enhanced collisionless heating in a non-uniform plasma” and [4] “Effectiveness of ECR and transmission resonant heating in ICP plasmas,” *Phys. Plasmas*, accepted (2005).

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