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Non-unique monopole oscillations of harmonically confined Yukawa systems¹ SAMUEL DUCATMAN, Grinnell College, CHRISTIAN HENNING, HANNO KAEHLERT, MICHAEL BONITZ, ITAP, University of Kiel, Germany — Recently it was shown that the Breathing Mode (BM), the mode of uniform radial expansion and contraction, which is well known from harmonically confined Coulomb systems [1], does not exist in general for other systems [2]. As a consequence the monopole oscillation (MO), the radial collective excitation, is not unique, but there are several MO with different frequencies. Within this work we show simulation results of those monopole oscillations of 2-dimensional harmonically confined Yukawa systems, which are known from, e.g., dusty plasma crystals [3,4]. We present the corresponding spectrum of the particle motion, including analysis of the frequencies found, and compare with theoretical investigations.

[1] D.H.E. Dubin and J.P. Schiffer, Phys. Rev. E 53, 5249 (1996)

[2] C. Henning et al., accepted for publication in Phys. Rev. Lett. (2008)

[3] A. Melzer et al., Phys. Rev. Lett. 87, 115002 (2001)

[4] M. Bonitz et al., Phys. Rev. Lett. 96, 075001 (2006)

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