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Superdiffusion in strongly coupled 2D Yukawa plasmas MICHAEL BONITZ[1], TORBEN OTT, Kiel University, Inst. Theoretical Physics and Astrophysics — Numerical simulation results for the mass transport by diffusion in dusty plasmas are presented and compared to experimental measurements, e.g. [1, 2]. For a wide range of parameters, an anomalous behaviour of the diffusion process, i.e., "superdiffusion," is shown to exist for monolayer systems. In such superdiffusive systems, the mean-squared displacement does not obey the Einstein relation $\langle|\vec{r}(t) - \vec{r}(t_0)|^2\rangle \sim t^\alpha$ with $\alpha = 1$. In contrast, the diffusion exponent is greater than unity on large time scales. The dependence of α on the plasma conditions has been investigated by varying the temperature, the screening and the dissipation in the numerical simulations, thus providing detailed predictions for the superdiffusion process in dusty plasmas [3,4]. In addition, we present results for the persistence of superdiffusion, i.e., we adress the question whether superdiffusion extends to arbitrarily long time scales. [1] B. Liu and J. Goree, *Physical Review Letters* **100**, 055003 (2008) [2] W.-T. Juan and L. I, *Physical Review Letters* **80**, 3073 (1998) [3] T. Ott, M. Bonitz, P. Hartmann, subm. to *Physical Review Letters* [4] T. Ott *et al.*, *Physical Review E* **78**, 026409 (2008)

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