

## Separation of polydisperse charged microparticles in air by an electrodynamic linear trap

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***The results of separation of a polydisperse mixture of charged dielectric microparticles using a linear electrodynamic quadrupole trap in air at atmospheric pressure are presented. It has been experimentally shown that the sizes of the microparticles held by the trap strongly depend on the voltage at the linear electrodes.***

***Keywords:*** charged particles, linear electrodynamic quadrupole trap, particle separation, trajectories of movement, air at atmospheric pressure.

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### REFERENCES

1. Vishnyakov V. I., Dragan G. S., Condens. Matter Phys. **10**, 201 (2007).
2. Vishnyakov V. I., Dragan G. S., Condens. Matter Phys. **6**, 687 (2003).
3. Smith B., Hyde T., Matthews L., Reay J., Cook M. and Schmoke J, Adv. Space Res. **41**, 1510 (2003).
4. Fortov V. E., Khrapak A. G., Khrapak S. A., Molotkov V. I. and Petrov O. F., Physics Uspekhi. **47** (5), 447 (2004).
5. Guo Tian, Xinyan Liu, Chenxi Zhang, Xiaoyu Fan, Hao Xiong, Xiao Che, Zhengwen Li, Binhang Yan, Lan Zhang, Ning Wang, Hong-Jie Peng and Fei We, Nat Commun. **13**, 5567 (2022).
6. Zalkind V. I., Zeigarnik Y. A., Nizovskii V.L., Nizovskii L. V. and Shchigel S. S., High Temp. **56**, 153 (2018).
7. Davis E. James, Aerosol Science and Technology **26:3**, 212 (2007).
8. Varaksin A. Yu., Protasov M. V. and Teplitskiy Yu. S., High Temperature **52**, 554 (2014).
9. Vasilyak L. M., Vladimirov V. I., Deputatova L. V., Lapitskiy D. S., Molotkov V. I., Pecherkin V. Ya., Filinov V. S. and Fortov V. E., New J. Phys. **15**, 043047 (2013).
10. Lapitskiy D. S., Filinov V. S., Deputatova L. V., Vasilyak L. M., Vladimirov V. I. and Pecherkin V. Ya., High Temp. **53**, 1 (2015).
11. Syrovatka R. A., Medvedev Yu., Filinov V. S., Vasilyak L. M., Deputatova L. V., Vladimirov V. I. and Pecherkin V. Ya., Physics Letters A **383**, 338 (2019).
12. Syrovatka R. A., Filinov V. S., Vasilyak L. M., Fortov V. E., Deputatova L. V., Vladimirov V. I. and Pecherkin V. Ya, Physics Letters A **383**, 1942 (2019).
13. Syrovatka R. A., Filinov V. S., Vasilyak L. M., Deputatova L. V., Pecherkin V. Ya. and Vladimirov V. I., Contributions Plasma Physics **61**, e202000109 (2020).
14. Syrovatka R. A., Filinov V. S., Vasilyak L. M., Pecherkin V. Ya., Deputatova L. V., Vladimirov V. I., Popel O. S. and Tarasenko A. B., Journal of Electrostatics **112**, 103583 (2021).
15. Deputatova L. V., Syrovatka R. A., Vasilyak L. M., Filinov V. S., Lapitskiy D. S., Vladimirov V. I. and Pecherkin V. Ya., Contributions Plasma Physics **59**, 340 (2018).
16. Pecherkin V. Ya., Vasilyak L. M. and Vladimirov V. I., Applied Physics, № 4, 18 (2022) [in Russian].

17. Rybin V., Rudyi S. and Rozhdestvensky Y., *International Journal of Non-Linear Mechanics*. **147**, 104227 (2022).
18. Lapitskii D. S., Filinov V. S., Vasilyak L. M., Syrovatka R. A., Deputatova L. V., Vladimirov V. I. and Pecherkin V. Ya., *Plasma Physics Reports* **45**, 406 (2019).
19. Syrovatka R. A., Deputatova L. V., Filinov V. S., Lapitsky D. S., Pecherkin V. Ya., Vasilyak L. M. and Vladimirov V. I., *J. Phys.: Conf. Ser.* **1147**, 012118 (2019).
20. Mihalcea B. M., Filinov V. S., Syrovatka R. A. and Vasilyak L. M., *Physics Reports* **1016**, 1 (2023).
21. Vasilyak L. M., Vladimirov V. I., Deputatova L. V., Lapitsky D. S., Molotkov V. I., Pecherkin V. Ya., Filinov V. S. and Fortov V. E., *New Journal of Physics* **15**, 043047 (2013).
22. Lapitsky D. S., Filinov V. S., Deputatova L. V., Vasilyak L. M., Vladimirov V. I. and Pecherkin V. Ya., *High Temperature* **53** (1), 3 (2015).
23. Dobroklonskaya M. S., Vasilyak L. M., Vladimirov V. I. and Pecherkin V. Ya., *Applied Physics*, № 2, 29 (2023) [in Russian].
24. Pecherkin V. Ya., Vasilyak L. M., Vetchinin S. P. and Panov V. A., *Journal of Physics: Conference Series* **653**, 015152 (2015).