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Evaporative cooling by autoresonance of any ion in an electrostatic ion beam trap[1] ODED HEBER, REETESH KUMAR GANGWAR, KOUSHIK SAHA, MICHAEL RAPPAPORT, DANIEL ZAJFMAN, Weizmann Institute of Science — Translation cooling of atomic or molecular ions is a perquisite in a few research areas. Electrostatic Ion Beam Trap (EIBT) can trap any ion with any mass or charge using the same tuning conditions; therefore, it is an ideal ion trap for ion beam cooling. Cooling of a bunch of ions from 1500 K to about 0.15 K has been demonstrated by using autoresonance process for about 80 ms and with ion-ion self-interaction [1]. During the process it has been shown that, the ion-ion collision transfer kinetic energy from the cold population to the hotter population, which in return are evaporated from the ion bunch. Hence reducing the temperature and increasing the phase space density. Further experiments and theoretical models are ongoing to improve the cooling efficiency and to achieve lower temperatures. [1] R. K. Gangwar, K. Saha, O. Heber, M.L. Rappaport, and D. Zajfman, Phys. Rev. Lett. 119, 103202 (2017).

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