

Abstract

This paper contains a brief analysis of the theory and mechanisms governing a quadrupole ion trap, also known as a Paul trap, using a simplified version that traps macroscopic particles in a dynamic electric field. We analyze the equation of motion governing the trapped particles, and numerically solve it to examine at what parameters of the equation a particle can be trapped stably in a dynamic electrical field. Moreover, we collect data from trapped particles, to ascertain their charge-to-mass ratio in two different ways.

We find that the equation of motion governing the particles movement in the trap coincide with the observed parameters, and that there is a correlation between the two different ways to obtain a charge-to-mass ratio.