

Optimum radius size between cylindrical ion trap and quadrupole ion trap

ABSTRACT

Quadrupole ion trap mass analyzer with a simplified geometry, namely, the cylindrical ion trap (CIT), has been shown to be well-suited using in miniature mass spectrometry and even in mass spectrometer arrays. Computation of stability regions is of particular importance in designing and assembling an ion trap. However, solving CIT equations are rather more difficult and complex than QIT equations, so, analytical and matrix methods have been widely used to calculate the stability regions. In this article we present the results of numerical simulations of the physical properties and the fractional mass resolutions of the confined ions in the first stability region was analyzed by the fifth order Runge-Kutta method (RKM5) at the optimum radius size for both ion traps. Because of similarity the both results, having determining the optimum radius, we can make much easier to design CIT. Also, the simulated results has been performed a high precision in the resolution of trapped ions at the optimum radius size.

Keyword: Quadrupole ion trap; Cylindrical ion trap; Optimum radius size; Fifth order Runge Kutta method; Stability regions; Ion trajectory; Fractional mass resolution