Abstract

A quantum system is associated with uncertainty in position and momentum space as given by the Heisenberg uncertainty principle, x px ~. This unbreakable lower bound is made even more stronger by the information theoretic inequality, S +S n(1+ln) [I. Bia lynicki-Birula, and J. Mycielski, Comm. Math. Phys. 44, 2,(1975), 129-132.], where S and S are information entropies due to the single particle charge densities in position and momentum spaces respectively. In this work, the question of how close to and in what fashion can this bound be achieved is addressed. It is numerically shown that this is possible via a high frequency AC driving of the quantum system. In the prescence of high frequency AC elds instead of ionization, stabilization happens for certain eld parameters. A minimum in the information entropy sum of dual spaces is numerically shown for model quantum systems under periodic high frequency driving conditions.The AC eld parameters at which the information entropy sum is minimum, is given in terms of the classical quiver distance 0 = 0 me!2 , where 0, eld strength and ! is the frequency. A code has been developed for calculating electron momentum densities of atoms from the electronic wavefunctions calculated using the GAMESS(General Atomic and Molecular Electronic Structure System) package. From this information entropies in position/momentum space have been calculated for the ground state of closed shell atoms with fully lled orbitals.