On the recombination in ultracold plasma trapped in an optical ponderomotive trap

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Inhomogeneous oscillating electric field exerts a force on a charged particle—the ponderomotive force. Charged particles are repelled from a region of high field intensity. In this paper an ultracold plasma trapped in the optical frequency field is studied. Trapping is achieved by using a hollow laser beam which has zero field amplitude in the beam's center and surrounds the plasma by high field region. We investigate how the trapping field changes the three-body recombination in the plasma using molecular dynamics calculations. Dependencies of the recombination rate on the trapping potential depth and inhomogeneity are discussed. Simple analytical model for the recombination in a ponderomotive trap is proposed.
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