

Abstract Submitted  
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**Thomas-Fermi model for Rydberg plasma clouds** H. TERÇAS, J.T. MENDONÇA, Instituto Superior Tecnico — We describe the effects of the electron trapping due to the background ions in ultra- cold plasmas, produced by excitation of Rydberg states in laser cooled atomic clouds. In the early stages of the ionization process, the ions are not thermalized with the electrons and can be described by a quasi-static Gaussian spatial profile, trapping the coldest fraction of the free electron population. In the present work, we study the electrostatic potential and the electron spatial profiles, in two different regimes. We show that in the strong confinement regime  $\Phi \gg T/e$ , a Rydberg plasma can be described by a Thomas-Fermi type of potential, similar to that obtained for heavy atomic species. The case of a non-neutral plasma cloud is also considered.

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