1050-41-42 **Dmitry Pelinovsky*** (dmpeli@math.mcmaster.ca), Dmitry Pelinovsky, Department of Mathematics, McMaster University, Hamilton, Ontario L8S 4K1, Canada. *On the Thomas-Fermi ground state in a parabolic trap.*

We study the nonlinear ground state of the Gross–Pitaevskii equation with a parabolic potential. The Thomas–Fermi approximation of the ground state was recently justified on various spatial scales using the variational method. We justify here the Thomas–Fermi approximation on an uniform spatial scale using the Painlevé-II equation. These results allow us to characterize the distribution of eigenvalues in the point spectrum of the Schrödinger operator associated with the nonlinear ground state. This is the joint work with Clement Gallo. (Received February 09, 2009)