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Solutions of the ultra-relativistic Thomas-Fermi equation MICHAEL ROTONDO, REMO RUFFINI, SHE-SHENG XUE, ICRANet and University of Rome "Sapienza" — The general solutions of a massive core at nuclear density are presented both from an analytic and numerical treatment. The analytic solutions generalize the solution introduced by Migdal, Volskerenskii and Popov in the case of heavy nuclei extending their treatment from $Z\sim10^7$ all the way to $Z\sim10^{57}$, corresponding to stellar massive cores. Special attention is given to the energetics of these configurations. It is shown that the solutions obeying the condition of global neutrality are much more bound than the traditional ones adopting the condition of local neutrality. The relevance of these solutions for X-ray busters models is outlined.

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