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Electron-positron pairs production in an electric potential of massive cores SHE-SHENG XUE, REMO RUFFINI, ICRANet and University of Rome “Sapienza” — Negative energy states of electrons bounded by a massive core with the charge-mass-radius Q/M and macroscopic radius R_c are discussed. We show that the negative energies of bound states are lower than the negative electron mass-energy ($-mc^2$), and energy-level-crossing occurs. If these bound states are not occupied, electron-positron pair production takes place by quantum tunneling. Electrons fill into these bound states and positrons go to infinity. We explicitly calculate the rate of such pair-production, and compare it with the rates of electron-positron production by the Sauter-Euler-Heisenberg-Schwinger and Hawking processes.

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