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Electromagnetic Properties of Stellar Matter. The Transverse Dielectric Permeability of the Protoquark Star Matter.

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Some electromagnetic properties of the protoquark star matter are investigated. It is assumed that during the formation of the protoquark star, the matter of the initial star was already opaque for neutrinos. Thus, this process was accompanied by the conservation of the total lepton charge. The lepton charges of the protoquark star and the initial star are almost equal. In our numerical calculations, the value of the lepton charge per baryon is taken to be 0.4. The thermodynamic characteristics of the hot quark matter during neutrino confinement are determined according to the NIL model. For different values of temperature $T \in [20 \div 100]$ MeV and baryon charge density $n_B [0 \div 1.8] \text{ fm}^{-3}$ in the hydrodynamic approximation, plasma frequencies of the quark matter are calculated. The spectrum and energy density of the equilibrium thermal radiation in the matter are also calculated. Although the plasma frequencies of the matter in the proto-quark star are very high, the spectrum of the thermal equilibrium radiation in the temperature range $T \in [20 \div 100]$ MeV is distorted insignificantly. This cannot be said about a cooled quark star. This is very important for calculating the thermal energy reserves of the proto-quark star.

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