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Effect of Landau damping in thermal and electrical conductivities of degenerate relativistic plasma.

The thermal and electrical conductivities of electrons (and possibly muons) owing to Coulomb scattering in a strongly degenerate relativistic plasma typical for cores and envelopes of neutron stars are considered. When relativistic electrons collide with plasma electrons, protons, and muons, usual Coulomb collisions via the exchange of longitudinal plasmons become inefficient, and Coulomb collisions due to the exchange of transverse plasmons dominate instead. A proper inclusion of the Landau damping of transverse plasmons into Coulomb scattering greatly modifies the kinetic coefficients and their temperature dependence. It makes Coulomb scattering more important for studying the kinetics of dense matter than it was thought before. A possible contribution of proton superfluidity into the plasma polarization properties is taken into account. It is shown that superfluidity suppresses the reduction of the diffusive heat and charge transport caused by the Landau damping.