Polarized angular-dependent reflectivity and density-dependent profiles of shock compressed xenon plasmas

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New data for the reflectivity of shock-compressed xenon plasmas of different target densities at pressures of 10-12 GPa at large incident angles are presented. These data allow to analyze the free electron density profile across the shock wave front. Assuming a Fermi-like density profile, the width of the front layer is inferred. The reflectivity for the s and p - polarized waves are calculated. The influence of the scattering on the atoms which has been taken into account at the level of the dynamical collision frequency prove to be essential for the understanding of the reflection process. Subsequently, as expected, a unique density profile is sufficient to obtain good agreement with the experimental data at different incident angles and at all investigated optical laser frequencies. Reflectivity measurements for different densities allow to determine the dependence of shock-front density profiles on the plasma parameters. As a result, it was found that the width of the front layer increases with decreasing density.