

Numerical Study on Radio Wave Scattering by Obstacles covered by Charged Particle Layer

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The present study addresses the characteristics of radio wave scattering by a solid obstacle that is surrounded by a dense electron sheath. Such investigations may contribute to various radio applications such as radar observations of space debris and small dust grains in space, as well as the plasma-based radar cross-section reduction techniques. We performed particle-in-cell simulations of an electron sheath formation around a conducting object. The obtained sheath and potential profiles are used for subsequent electromagnetic simulations, in which an incident radio wave is scattered by the conducting object covered with the dense electron layer. It is confirmed that an effective radar cross-section of such an object will differ from that placed in free space. We will report some preliminary results obtained from those simulations.

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