

# Estimation of electromagnetic wave scattering by low-temperature plasma

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The problem of electromagnetic wave scattering by plasmoids is important for the meteor radio communication, the meteor radio astronomy and the plasma-based radar cross section reduction [1]. Three-dimensional simulations are used for a solution of this problem for inhomogeneous plasmoid [2].

The estimation results can be obtained when the electric currents excited by the incident wave in the set of both small volumes of penetrable plasma and small areas of the wave reflection surface are considered as elementary electric dipoles. According to the Huygens principle the scattered field is the superposition of fields created by this dipoles [3].

A model of electromagnetic wave backscattering by axial-symmetric bundle of low-temperature plasma is formulated. Numerical calculation technique on the basis of proposed model is presented. Analytical expressions for the fields backscattered by the partially reflecting plasma cylinder and penetrable cone-shaped plasmoid are obtained. Analytical and computational results are compared.

- [1] Hema S, Simy A and Rakesh M 2016 *Plasma-based Radar Cross Section Reduction* (Springer Singapore)
- [2] Xuyang C, Fangfang S, Yanming L, Wei A and Xiaoping L 2018 *Plasma Sci. Technol.* **20** 065503
- [3] Naumov N D and Petrovsky V P 2023 *Vestnik OIVT RAN* **10** 64–66