

Propagation loss of surface waves in a structured metal surface

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We calculated the propagation lengths for surface waves in a structured metal surface which has a square array of square holes with a finite depth using the finite-difference time-domain method. In order to simulate the metal structures, the Drude model is used. The periodic boundary conditions are applied to obtain the propagation lengths. By calculating the propagation length for various depths of the holes, damping constants and plasma frequencies, we show that the propagation loss of the surface wave is not dependent on the depth when the depth is larger enough than the period, but mainly dependent on the damping constant and the plasma frequency.

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[2] Z. Ruan and M. Qiu, "Negative refraction and sub-wavelength imaging through surface waves on structured perfect conductor surfaces," *Opt. Express* 14, 6172 (2006).