# Electromagnetic scattering by cylindrical orthotropic waveguide irises

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We will present a mathematical analysis of scattered time-harmonic electromagnetic waves by an infinitely long cylindrical orthotropic waveguide iris. This is modeled by an orthotropic Maxwell system in a cylindrical waveguide iris for plane waves propagating in the $x_3$-direction, imbedded in an isotropic infinite medium. The problem is equivalently reduced to 2-dimensional boundary-contact problem with the operator $\operatorname{div} M \operatorname{grad} + k^2$ inside the domain and the (Helmholtz) operator $\Delta + k^2 = \operatorname{div} \operatorname{grad} + k^2$ outside the domain. Here $M$ is a $2 \times 2$ positive definite, symmetric, matrix with constant, real valued entries. The unique solvability of the appropriate boundary value problems is proved and regularity of solutions is established in Bessel potential spaces.

The talk is based on a joint work with R. Duduchava and D. Kapanadze.