The Dirichlet-to-Neumann operator on rough domains

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We consider a bounded connected open set $\Omega \subset \mathrm{R}^d$ whose boundary Γ has a finite $(d-1)$-dimensional Hausdorff measure. Then we define the Dirichlet-to-Neumann operator D_0 on $L_2(\Gamma)$ by form methods. The operator $-D_0$ is self-adjoint and generates a contractive C_0-semigroup $S = (S_t)_{t>0}$ on $L_2(\Gamma)$. We show that the asymptotic behaviour of S_t as $t \to \infty$ is related to properties of the trace of functions in $H^1(\Omega)$ which Ω may or may not have. We also show that they are related to the essential spectrum of the Dirichlet-to-Neumann operator.

The talk is based on a joint work with W. Arendt (Ulm).