Complex-scaling method for the complex plasmonic resonances of particles with corners

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This talk will present recent results on the existence and computation of complex plasmonic (CP) resonances $\varepsilon_n \in \mathbb{C}\setminus\mathbb{R}$ for planar particles whose boundaries are smooth except for a finite number of straight corners.

CP resonances are associated with strongly-oscillating fields that do not belong to $H^1_{\text{loc}}$, which prevents from directly using $H^1$-conforming 2D finite element (FE) approximations. However we show that CP resonances can be computed as eigenvalues of a modified plasmonic eigenvalue problem, obtained using a corner complex scaling, whose FE discretization yields a complex-symmetric linear generalized eigenvalue problem of the form $AU = \varepsilon BU$ [1]. Numerical results corroborate the study [2], which proved the existence of embedded plasmonic eigenvalues and discussed the construction of particles that exhibit CP resonances.
