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Approximations in the Direct Problem for Impedance Tomography. Preliminary report.

The medical imaging technique known as electrical impedance tomography (EIT) is related to the inverse conductivity problem first posed by Calderón in 1980. In dimension two, Nachman made the breakthrough by providing a solution for the recovery of a sufficiently regular conductivity from the corresponding Dirichlet-to-Neumann map. This occurs by solving for the trace of complex geometric optic (CGO) solutions on the boundary and using these to define the nonphysical scattering transform. In this talk, we show that Nachman's integral equations still hold for bounded conductivities σ in the unit disk $\mathbb{D}$ if there is an $r \in (0,1)$ such that $\sigma(x) \equiv 1$ for $|x| \geq r$. We also show that if σ_n is a sequence of smooth functions that converge to σ pointwise, the corresponding scattering transforms converge as well.

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