Hearing pseudoconvexity in Lipschitz domains with holes via $\bar{\partial}$

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Abstract: In this talk, I will explain the proof of the following result due to C. Laurent-Thiebault, M.-C. Shaw and myself: Let $\Omega = \check{\Omega} \setminus \check{D}$ where $\check{\Omega}$ is a bounded domain with connected complement in $\mathbb{C}^n$ and $D$ is relatively compact open subset of $\check{\Omega}$ with connected complement in $\check{\Omega}$. If the boundaries of $\check{\Omega}$ and $D$ are Lipschitz and $C^2$-smooth respectively, then both $\check{\Omega}$ and $D$ are pseudoconvex if and only if $0$ is not in the spectrum of the $\bar{\partial}$-Neumann Laplacian on $(0,q)$-forms for $1 \leq q \leq n - 2$ when $n \geq 3$; or $0$ is not a limit point for the spectrum of the $\bar{\partial}$-Neumann Laplacian on $(0,1)$-forms when $n = 2$. 