Cheng Cheng and Ingrid Daubechies*, ingrid@math.duke.edu. Phase Retrieval for Windowed Fourier Transform samples.

When a square integrable function $f \in L^2(\mathbb{R})$ consists of several “components” that are widely separated in time-frequency space, it is hard to retrieve $f$ from the knowledge of the magnitudes $(|\langle f, g_{a,b} \rangle|)_{m,n \in \mathbb{Z}}$, where $g_{a,b}(x) = \exp(2\pi ia x)g(x-b)$. The instability of the phase retrieval problem (determining $f$ from the $|\langle f, g_{a,b} \rangle|$) has been discussed in a number of recent papers. When $g$ is a Gaussian, and one considers $a$ and $b$ as continuous variables, Grohs and Rathmair expressed this instability, in Stable Gabor Phase Retrieval and Spectral Clustering, in terms of a Cheeger constant that quantifies the “delocalization” of $|\langle f, g_{a,b} \rangle|$. We show a similar result for the discrete case, where $a = m\alpha$, $b = n\beta$, with $m, n \in \mathbb{Z}$; we extend this to other functions $g$ than Gaussians.

The presentation will start by a brief review, focusing on the link between “separation” and “instability”, before describing the authors’ recent results and open problems. (Received September 12, 2019)