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Palle E. T. Jorgensen* (palle-jorgensen@uiowa.edu), Dept Math MLH, University of Iowa, Iowa City, IA 52242. *Probability theory of infinite iterated function systems.*

The study of spectral duality for singular measures started with a joint paper, Jorgensen-Pedersen. In the case of affine IFS measures μ , when an associated complex Hadamard matrix is further assumed to satisfy an additional symmetry condition; then the $L^2(\mu)$ Hilbert space will have an orthogonal Fourier basis; in other words we get an associated fractal Fourier transform. In order to appreciate the nature of the spectral duality, note that spectral duality holds for the middle-1/4 Cantor measure, but not for its middle-1/3 cousin. Typically the distribution of the associated Fourier frequencies satisfies very definite lacunary properties, in the form of geometric almost-gap distributions; the size of the gaps grows exponentially, with sparsity between partitions. The probabilistic significance will be explored. Use will be made of reproducing kernel Hilbert spaces of analytic functions. (Received January 14, 2016)