1037-42-26 **Yue M. Lu**, **Minh N. Do** and **Richard S. Laugesen*** (Laugesen@uiuc.edu). *Computable Fourier condition for alias-free sampling lattices.*

Which lattices yield alias-free sampling for a given domain in $\mathbb{R}^N$? That is, for which lattices are the lattice-translates of the domain all disjoint? Can one find a close-to-critical sampling lattice for which the translates cover (or pack) as much of $\mathbb{R}^N$ as possible?

We develop a Fourier-based necessary condition for identifying alias-free sampling lattices and estimating their packing ratios. We show in particular how to apply the condition on polygonal and polyhedral domains in 2 and 3 dimensions.

A key step is to construct a search space of quantized (*e.g.* integer) sampling lattices via Hermite normal forms, and to estimate the number of such lattices. (Received December 13, 2007)