1035-37-1236 **Jessica M Conway*** (j-conway@northwestern.edu), Northwestern University, Dept of Engineering Sciences and Applied Math, Evanston, IL 60208, and **Hermann Riecke** (h-riecke@northwestern.edu), Northwestern University, Dept of Engineering Sciences and Applied Math, Evanston, IL 60208. *Superlattice patterns in oscillatory systems with multi-frequency forcing.*

Superlattice patterns and quasipatterns, while well-studied in waves on the surface of vertically vibrated viscous fluids (Faraday waves), have found little attention in forced oscillatory systems. We study such patterns, comprised of 4 or more Fourier modes at different orientation, by applying multi-frequency forcing to systems undergoing a Hopf bifurcation to spatially homogeneous oscillations. For weak forcing composed of 3 frequencies near the 1:2- and 1:3-resonance such systems can be described by a suitably extended complex Ginzburg-Landau equation with time periodic coefficients. Using Floquet theory and weakly nonlinear analysis we obtain the amplitude equations for simple patterns (comprised of 1, 2, or 3 modes) and superlattice patterns. By judicious choice of the forcing function we stabilize these patterns via spatiotemporal resonance and find stable subharmonic 4- and 5-mode patterns. We confirm our analysis through numerical simulation. (Received September 19, 2007)