1145-35-1203 **Jun Geng** and **Jinping Zhuge*** (jinping.zhuge@uky.edu). *Oscillatory integrals and homogenization of elliptic systems with Robin boundary condition.*

In this talk, we will consider elliptic systems with rapidly oscillating coefficients and a Robin boundary condition,

$$\begin{cases} -\mathrm{div}(A(x/\varepsilon)\nabla u_\varepsilon) = F & \text{in } \Omega, \\ \dfrac{\partial u_\varepsilon}{\partial \nu_\varepsilon} + b(x/\varepsilon) u_\varepsilon = g & \text{on } \partial\Omega, \end{cases}$$

where $\partial/\partial\nu_\varepsilon$ denotes the conormal derivative. We assume A and b are both 1-periodic and $\varepsilon > 0$ is a small parameter. To study the above equation under minimal assumptions, we consider the oscillatory integral $\int_S f(\lambda x) g(x) d\sigma$, where $S = \partial\Omega$ is a Lipschitz surface. We show that if S satisfies a non-resonance condition, $f(y)$ is continuous and 1-periodic, and $g \in L^1(S, d\sigma)$, then

$$\lim_{\lambda\to\infty} \int_S f(\lambda x) g(x) d\sigma = \int_{[0,1]^d} f(x) dx \int_S g(x) d\sigma.$$

We show this result implies the qualitative homogenization theorem for the previous equation, if $\partial\Omega$ satisfies a resonance condition. Furthermore, under additional geometric and smooth conditions, we also obtain a rate of convergence. (Received September 20, 2018)