1092-35-29 **Christophe Prange*** (cp@math.uchicago.edu), Dept. of Mathematics, 5734 S. University Avenue, CHICAGO, IL 60637. *Boundary layers in homogenization.*

This talk is concerned with the homogenization of elliptic systems in divergence form, with periodically oscillating coefficients and boundary data:

$$\begin{cases} -\nabla \cdot A\left(\frac{x}{\varepsilon}\right)\nabla u^\varepsilon &= 0, & x \in \Omega \\ u^\varepsilon &= \varphi\left(x, \frac{x}{\varepsilon}\right), & x \in \partial\Omega \end{cases}.$$

These boundary layer systems arise for example when improving the accuracy of multiscale expansions near the boundaries in periodic homogenization.

The two main problems one encounters in the homogenization of such systems are: the lack of uniform bounds on u^ε in $H^1(\Omega)$, and the fact that the boundary breaks the periodic microstructure. One of the questions is to understand the connection between the behaviour of u^ε far from the boundary $\partial\Omega$ and the way the boundary intersects the microstructure.

The talk will focus on the case when $\Omega \subset \mathbb{R}^2$ is a polygonal domain. Results on this problem have been obtained under various assumptions on the normals of the edges: rationality, small divisors. We will review the different settings and explain the recent results obtained without any assumption on the normals [C.P. SIMA 2013]. (Received July 05, 2013)