

# SCMS Seminar



## OVERCONVERGENCE OF ETALE (PHI, TAU)-MODULES

### LECTURE 1

**Dr. Hui Gao**

**University of Helsinki**

**Time:** 14:00-16:00, Friday, May 5, 2017

**Venue:** Room 2201, East Main Guanghai Tower, Handan Campus

**Abstract:** The category of etale  $(\phi, \tau)$ -modules, similar as the category of etale  $(\phi, \Gamma)$ -modules, is equivalent to the category of  $p$ -adic Galois representations. A classical theorem of Cherbonnier-Colmez says that all etale  $(\phi, \Gamma)$ -modules are overconvergent. In this talk, we show that all etale  $(\phi, \tau)$ -modules are also overconvergent. Our method is completely different from that of Cherbonnier-Colmez. The key idea is a certain crystalline approximation technique. This is joint work with Tong Liu.

#### Lecture 1.

I will recall the classical theorem of Cherbonnier-Colmez on overconvergence of etale  $(\phi, \Gamma)$ -modules.

Then I will recall Kisin modules and  $(\phi, \hat{G})$ -modules, which will be the key tool in integral  $p$ -adic Hodge theory in our setting.