

**Akio Tamagawa: Specialization of  $\ell$ -adic representations of arithmetic fundamental groups and applications to arithmetic of abelian varieties**

In this talk, I will survey some recent developments concerning specialization of  $\ell$ -adic representations of arithmetic fundamental groups and their applications to arithmetic of abelian varieties. Among other things, I will discuss certain uniform open image theorems and their applications to uniform boundedness of  $\ell$ -primary torsion of abelian varieties, as well as to the modular tower conjecture in inverse Galois theory. (This first part is a joint work with Anna Cadoret and related to her talk.) I will also discuss certain specialization results for first cohomology groups and their applications to arithmetic of abelian varieties over finitely generated fields. In particular, I will introduce new notions of "discrete Selmer groups" and "discrete Shafarevich-Tate groups", which are finitely generated abelian groups. (This second part is a joint work with Mohamed Saidi and related to his talk.);