Speaker: **Saito, Masahico**
Title: *Generalizations of quandle cocycle invariants*
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Abstract: Cohomology theories of quandles, that are analogues of cohomology theories of groups and other algebraic systems, have been developed. State-sum invariants called quandle cocycle invariants were defined for knots and knotted surfaces, using quandle colorings and cocycles of a quandle cohomology theory, and applications to non-invertibility and triple point numbers of knotted surfaces were given. Recently, quandle cohomology and extension theories have been generalized to the cases where quandles act on the coefficient groups. After a brief review on quandle cocycle invariants and these recent developments, corresponding generalizations of cocycle knot invariants will be discussed. Another direction of recent developments is to generalize quandles to biquandles, mainly for the study of virtual knots. A cohomology theory for set-theoretic Yang-Baxter equations is defined from this context, and corresponding cocycle state-sum invariants will be discussed.