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Speaker: Dr. Kazim Buyukboduk, Stanford University.

Title: Kolyvagin systems of Stark units.

Abstract: B. Howard, B. Mazur and K. Rubin proved that the existence of Kolyvagin systems relies on a cohomological invariant, what they call the core Selmer rank. When the core Selmer rank is one, they determine the structure of the Selmer group completely in terms of a Kolyvagin system. However, when the Selmer core rank is greater than one such a precision could not be achieved. In fact, one do not expect a similar result for the structure of the Selmer group in general, as a reflection of the fact that Bloch-Kato conjectures do not in general predict the existence of special elements, but a regulator, to compute the relevant L-values. An example of a core rank greater than one situation arises if one attempts to utilize the Euler system that would come from the Stark elements (whose existence were predicted by K. Rubin) over a totally real number field. This is what I will discuss in this talk. I will explain how to construct, using Stark elements, Kolyvagin systems for certain modified Selmer structures (that are adjusted to have core rank one) and relate them to appropriate ideal class groups, following the machinery of Kolyvagin systems and prove a Gras-type conjecture. Should time permit, I will also discuss how to extend our technique to deduce main conjectures of Iwasawa theory over totally real number fields.