1163-11-747   **Hanson Smith*** (`hanson.smith@uconn.edu`). *Ramification in Division Fields and Sporadic Points on Modular Curves.*

Consider an elliptic curve E over a number field K. Suppose that E has supersingular reduction at some prime $\mathfrak{p}$ of K lying above the rational prime p and that $E(K)$ has a point of exact order p^n. To describe the minimum necessary ramification at $\mathfrak{p}$, one can classify the valuations of the p^n-torsion points of E by the valuation of a coefficient of the pth division polynomial. In particular, if E does not have a canonical subgroup at $\mathfrak{p}$, one can show that $\mathfrak{p}$ has ramification index at least $p^{2n} - p^{2n-2}$ over p.

In this talk we will briefly outline how to achieve such a classification. We will then apply our work to show that sporadic points on the modular curve $X_1(p^n)$ cannot correspond to supersingular elliptic curves without a canonical subgroup. Our methods are generalized to $X_1(N)$ with N composite. (Received September 12, 2020)