Torsion subgroups of rational elliptic curves over infinite extensions of $\mathbb{Q}$.

Let $E/\mathbb{Q}$ be an elliptic curve. In this talk we consider the question of what torsion subgroups can occur when we base extend $E$ to some infinite field extensions $K/\mathbb{Q}$. For example, if $K$ is the compositum of all cubic extensions of $\mathbb{Q}$, we show that the torsion subgroup of $E(K)$ is finite and determine 20 possibilities for its structure. This work is partially joint with Álvaro Lozano-Robledo, Filip Najman, and Andrew Sutherland (Received July 27, 2017)