1146-20-118 **Kevin Kordek** and **Nick Salter*** (nks@math.columbia.edu). *Congruence subgroups and the Burau representation.* Preliminary report.

This talk is a report on some work-in-progress with Kevin Kordek. In the theory of arithmetic groups, congruence subgroups arise by passing to some quotient of the ring of definition; the simplest such examples are the "level-L" subgroups $GL_n(\mathbb{Z})[L]$ defined as the kernel of the reduction map $GL_n(\mathbb{Z}) \to GL_n(\mathbb{Z}/L\mathbb{Z})$. A similar construction can be carried out for the ring $\mathbb{Z}[t, t^{-1}]$ of Laurent polynomials by setting t to some value $\zeta \in \mathbb{C}^\times$, giving rise to a notion of a level subgroup in $GL_n(\mathbb{Z}[t, t^{-1}])$. By intersecting with the image of the Burau representation, we find a rich family of level subgroups of the braid group; classically it is known that the pure braid group is just the level-$t-1$ subgroup, and the "hyperelliptic Torelli group" is the level-$t+1$ subgroup. Applying some ideas from the classical theory of level subgroups, we gain a new perspective on the structure of these groups. Sample applications include the discovery of a new abelian quotient of the hyperelliptic Torelli group as well as a beautifully coherent treatment of the abelianization of the pure braid group. (Received January 13, 2019)