1127-20-184 **Joseph Ricci*** (ricci@math.ucsb.edu) and **Zhenghan Wang** (zhenghwa@math.ucsb.edu).

Congruence subgroups from representation of the three-strand braid group.

Ng and Schauenburg proved that the kernel of a $(2+1)$-dimensional topological quantum field theory representation of $\mathrm{SL}(2,\mathbb{Z})$ is a congruence subgroup. Motivated by their result, we explore when the kernel of an irreducible representation of the braid group B_3 with finite image enjoys a congruence subgroup property. In particular, we show that in dimensions two and three, when the projective order of the image of the braid generator σ_1 is between 2 and 5 the kernel projects onto a congruence subgroup of $\mathrm{PSL}(2,\mathbb{Z})$ and compute its level. However, we prove for three dimensional representations, the projective order is not enough to decide the congruence property. In particular, for each odd integer $\ell \geq 3$ we construct a pair of non-congruence subgroups associated with three-dimensional irreducible representations having finite image and σ_1 mapping to a matrix with projective order 2ℓ. Our technique uses classification results of low dimensional braid group representations, and the Fricke-Wohlfarht theorem in number theory. (Received February 02, 2017)