1110-11-186 **Nils Bruin*** (nbruin@sfu.ca), Department of Mathematics, Simon Fraser University, Burnaby, BC V5A1S6, Canada, and **Tom Fisher**. *Twists of Shioda modular surfaces of level 4.* Preliminary report.

One of the most mysterious objects associated to an elliptic curve E is its Tate-Shafarevich group. Its elements can be represented by classes in the Galois-cohomology group $H^1(\mathbb{Q}, E[n])$, for various n. Mazur defines a class $\xi \in H^1(\mathbb{Q}, E[n])$ to be *visible* if there exists another elliptic curve E' with $E'[n] \simeq E[n]$ such that the homogeneous space under E' corresponding to ξ has a rational point. Visibility provides information about the image of ξ in $\mathrm{Sha}(E)$.

Mazur showed that any ξ representing an element in $\mathrm{Sha}(E)[3]$ can be made visible. His proof uses that the elliptic surface obtained from the universal elliptic curve over $X(3)$ is rational. The visibility follows from the fact that a certain twist of this surface has a rational point.

The case $\xi \in H^1(\mathbb{Q}, E[4])$ is particularly interesting. The curve $X(4)$ is rational, but the relevant elliptic surface is not. It is a K3 surface. Further complications in determining the correct surface arise from the fact that 4 is even. We will discuss how to compute a model of the relevant surface given ξ and give some examples of the various obstructions to rational points that can arise on these surfaces. (Received February 20, 2015)