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An “Eichler-Shimura” congruence in a bad reduction case

Let $X_1(p)$ be the Siegel moduli space classifying principally polarized abelian varieties of genus g with a non-trivial p -division point. Let χ be a non-trivial character of $\mathbb{Z}/p\mathbb{Z}$. The χ -equivariant part of the cohomology of $X_1(p)$ is the sum of two pieces: one on which the inertia acts through χ , and one on which it acts trivially. We exhibit a polynomial annihilating Frobenius on the latter piece. This result will be used in a joint work with J. Tilouine.