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**Andrew V Sutherland\*** ([drew@math.mit.edu](mailto:drew@math.mit.edu)) and **David Zywina**. *Modular curves of prime-power level with infinitely many rational points.*

For each prime power  $N$  and subgroup  $G$  of  $\mathrm{GL}_2(\mathbb{Z}/N\mathbb{Z})$  containing  $-I$  with surjective determinant map, let  $X_G/\mathbb{Q}$  denote the modular curve that parametrizes elliptic curves whose mod- $N$  Galois representation has image contained in  $G$ . We determine a complete list of the 248 modular curves  $X_G$  for which  $X_G(\mathbb{Q})$  is infinite and construct explicit maps from each  $X_G$  to the  $j$ -line. In addition to  $X(1)$  this list includes 219 modular curves of genus 0 with  $N \in \{2, 3, 4, 5, 7, 8, 9, 13, 16, 25, 27, 32\}$ , and 28 of genus 1 with  $N \in \{11, 16\}$ . For each prime  $\ell$  these results provide an explicit classification of  $\overline{\mathbb{Q}}$ -isomorphism classes of elliptic curves  $E/\mathbb{Q}$  according to their  $\ell$ -adic Galois image, up to a finite set of exceptional  $j$ -invariants. (Received January 14, 2016)