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**Christopher Rasmussen\*** ([crasmus@rice.edu](mailto:crasmus@rice.edu)), Department of Mathematics MS-136, Rice University, Houston, TX 77251-1892. *A finiteness conjecture for abelian varieties over number fields.*

The properties of the outer Galois representation attached to the pro- $\ell$  fundamental group of the projective line minus three points are strongly connected to the arithmetic of certain covers of the projective line. In many cases, such covers have Jacobians whose  $\ell$ -power torsion is rational over the fixed field of the representation. Conjecturally, such curves are quite rare – for a fixed number field  $K$  and genus  $g$  (but varying  $\ell$ ), the number of such curves up to isomorphism is finite. We report on a proof for this conjecture in the ‘base case’ for  $K = \mathbb{Q}$  and  $g = 1$ , and determine exactly the set of elliptic curves over  $\mathbb{Q}$  with this arithmetic property. This work is joint with Akio Tamagawa. (Received February 18, 2006)