1089-11-129 **David Zywina*** (zywina@math.ias.edu). *Elliptic surfaces and the Inverse Galois Problem.*

The Inverse Galois Problem asks whether every finite group G occurs as the Galois group of some extension of $\mathbb{Q}$, i.e., whether there is a Galois extension $K/\mathbb{Q}$ such that $Gal(K/\mathbb{Q})$ is isomorphic to G. This problem is still wide open, even in the special case of simple groups.

By studying the Galois action on the étale cohomology of some well-chosen families of elliptic surfaces, we will prove many new cases of the Inverse Galois problem. In particular, we will explain why the simple groups $PSp_4(\mathbb{F}_p)$, with p an odd prime, occur as Galois groups of extensions of $\mathbb{Q}$. The key ingredients are a big monodromy result and some known cases of the Birch and Swinnerton-Dyer conjecture. (Received February 09, 2013)