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**David Zureick-Brown\*** (dzb@mathcs.emory.edu), 400 Dowman Drive, Atlanta, GA 30322.

*Progress on Mazur's Program B.*

I'll discuss recent progress on Mazur's "Program B" – the problem of classifying all possibilities for the "image of Galois" for an elliptic curve over  $\mathbb{Q}$  (equivalently, classification of all rational points on certain modular curves  $X_H$ ).

This will including my own recent work with Jeremy Rouse which completely classifies the possibilities for the 2-adic image of Galois associated to an elliptic curve over the rationals. I will also discuss a large number of other very recent results by many authors. (Received September 07, 2018)