1037-57-201    **Chris Herald**, **Paul Kirk** and **Charles Livingston\*** (`livingst@indiana.edu`), Department of Mathematics, Indiana University, Bloomington, IN 47405. *Twisted Alexander polynomials, metabelian representations, and the knot slicing problem.* Preliminary report.

Let $X$ be the $p$–fold branched cyclic cover of a knot $K$. To each homomorphism of $H_1(X)$ to $Z/qZ$ there is associated a "twisted Alexander polynomial" with coefficients in the cyclotomic field $Q[z]$, where $z$ is a $q$–root of unity. Previous work has shown that such polynomials provide obstructions to a knot being slice. Here it is shown how these polynomials can be interpreted as (twisted) homological invariants of the knot complement itself. This leads to efficient computational algorithms. One application is the resolutions of the slicing problem for 16 of the remaining 18 unknown cases among prime knots of 12 or fewer crossings. A second application constructs 5–stranded pretzel knots for which it can be shown that all 24 associated mutant knots are distinct in concordance. (Received February 02, 2008)