1086-11-2656 **Hanna Astephan**, **Solly Parenti**, **Joe Varilone**, **Nick Wasylyshyn** and **Ben Zinberg*** (bzinberg@mit.edu), 3 Ames St. #M508, Cambridge, MA 02142, and **Michael Zieve**. *Common Values of Polynomials Over Finite Fields.* Preliminary report.

Let K be the finite field of q elements, K_i its degree-i extension, and f and g polynomials in $K[x]$ of degree at most n. We provide several results and examples about the possibilities for N, where N is the cardinality of the intersection of the image sets $f(K)$ and $g(K)$. For instance, there are positive constants a_n and b_n, which depend only on n, such that either $N < 2n$ or $N > a_n q - b_n sqrtq$. Moreover, if $f(K) = g(K)$ and q is larger than some explicit function of n, then there are infinitely many i for which $f(K_i) = g(K_i)$. If additionally f and g have prime degree, then there are very few possibilities for the monodromy group of f (which equals the monodromy group of g, except when f and g come from a known list of polynomials). By combining calculations inside the possible monodromy groups with factorization arguments, we obtain a partial classification of all such polynomials f and g. On the other hand, there are rational functions $f, g \in K(x)$ such that $f(K_i)$ equals $g(K_i)$ for even i, but $f(K_i)$ and $g(K_i)$ are disjoint for odd i. Our results depend on various ingredients, including deep group-theoretic results and a new function field analogue of the Frobenius Density Theorem. (Received September 25, 2012)