1077-11-376 **Todd Cochrane** (cochrane@math.ksu.edu), Department of Mathematics, 138 Cardwell Hall, Kansas State University, Manhattan, KS 66506, **Craig V. Spencer** (cvs@math.ksu.edu), Department of Mathematics, 138 Cardwell Hall, Kansas State University, Manhattan, KS 66506, and **Hee-Sung Yang*** (hee-sung.yang@dartmouth.edu), Department of Mathematics, 6188 Kemeny Hall, Dartmouth College, Hanover, NH 03755. *Rational linear spaces on hypersurfaces over quasi-algebraically closed fields.*

A field k is called a C_i field if every form of degree d with coefficients in k having more than d^i variables has a non-trivial zero. C_i theory is a powerful tool in that it provides a sharp bound for the number of variables necessary for an arbitrary form to have a non-trivial zero. Suppose $f_1, \ldots, f_r$ are forms in s variables over $k := \mathbb{F}_q(t)$, a C_2 field, of degrees $d_1, \ldots, d_r$, respectively. Using extensive combinatorial techniques and C_i theory, we determine a bound for the number of variables necessary for $f_1, \ldots, f_r$ to have a projective l-dimensional rational linear space of simultaneous zeros, namely

$$s > l + \sum_{j=1}^{r} \sum_{w=1}^{d_j} w^2 \binom{d_j - w + l - 1}{l - 1},$$

which is considerably sharper than the analogous bound for a single odd-degree form over $\mathbb{Q}$. With this result, we also establish that, given $s > 1 + \sum_{j=1}^{r} \frac{d_j(d_j+1)(2d_j+1)}{6}$, for any $\mathbb{F}_q(t)$-rational zero $\mathbf{a} = (a_1, \ldots, a_s)$, we can find infinitely many s-tuples of monic irreducible polynomials $(\varpi_1, \ldots, \varpi_s)$, with ϖ_m not all equal, so that $(a_1\varpi_1, \ldots, a_s\varpi_s)$ vanishes f_j for $1 \leq j \leq r$. We also prove more general results for forms over C_i fields. (Received September 22, 2011)