1017-14-179 **Daniel C. Cohen**, **Graham Denham**, **Michael J. Falk*** (michael.falk@nau.edu) and **Alexander N. Varchenko**. *Critical loci of products of integral powers of linear forms.* Preliminary report.

We describe work in progress on the relationship between the critical locus of a product of integral powers of linear forms and the cohomology of the Orlik-Solomon algebra of the associated hyperplane arrangement under multiplication by the corresponding logarithmic one-form. The Orlik-Solomon algebra is the $\mathbb{C}$-subalgebra of the DeRham complex generated by the logarithmic derivatives of the linear forms. The general idea is that, if the vector of exponents is a resonant weight for the cohomology of the Orlik-Solomon algebra, then the critical locus of the corresponding function is positive-dimensional, with the dimension (and number of components) determined by the lowest-degree non-vanishing cohomology group. We give examples and establish some partial results and special cases. (Received February 21, 2006)