Hal Schenck and Stefan Tohaneanu* (stefan.tohaneanu@uc.edu), Department of Mathematical Sciences, The University of Cincinnati, P O Box 210025, Cincinnati, OH 45221-0025. The Orlik-Terao algebra and formal arrangements. Preliminary report.

The Orlik-Solomon algebra is the cohomology ring of the complement of a hyperplane arrangement $\mathcal{A}$; it is the quotient of an exterior algebra $\Lambda(V)$ by a homogeneous ideal. Orlik and Terao introduced a commutative analog $\text{Sym}(V^*)/I$ of the Orlik-Solomon algebra to answer a question of Aomoto and showed the Hilbert series depends only on the intersection lattice $L(\mathcal{A})$. Falk and Randell introduced the property of formality; in this note we study the relation between formality and the Orlik-Terao algebra. Our main result is a necessary and sufficient condition for formality in terms of the quadratic component $I_2$ of the Orlik-Terao ideal $I$. The key insight is that formality is determined by the tangent space $T_p(V(I_2))$ at a generic point $p$. (Received January 23, 2008)