Vanishing results for the Aomoto complex of real hyperplane arrangements via minimality (Joint work with M. Yoshinaga)

Let $\mathcal{A} = \{H_1, \ldots, H_n\} \subset \mathbb{R}^l$ be an essential arrangement of affine hyperplanes, and $M(\mathcal{A}) = \mathbb{C}^l \smallsetminus \bigcup_{H \in \mathcal{A}} H_{\mathbb{C}}$ be the complement of the complexified arrangement. Let $A^\bullet_R(\mathcal{A})$ be the Orlik-Solomon algebra of $\mathcal{A}$, with generators e_i, $1 \leq i \leq n$, and coefficients in a commutative unitary ring R. Consider the Aomoto complex $(A^\bullet_R(\mathcal{A}), \omega\wedge)$ induced by $\omega = \sum_{i=1}^n \lambda_i e_i \in A^1_R(\mathcal{A})$. Aomoto complexes have a purely combinatorial description and several conditions for the vanishing of their cohomology are already known.
In this talk we give a vanishing result of the cohomology of the Aomoto complex in terms of nonresonant condition along the hyperplane at infinity of the coning of $\mathcal{A}$. The proof is using minimality of arrangements and descriptions of Aomoto complex in terms of chambers. Our methods also provide a new proof for the well known vanishing theorem of local system cohomology groups of $M(\mathcal{A})$ which was first proved by Cohen, Dimca and Orlik.

Reference: P. Bailet, M. Yoshinaga: Vanishing results for the Aomoto complex of real hyperplane arrangements via minimality; arXiv:1512.05318