# PERCOLATION ON HOMOLOGY GENERATORS IN CODIMENSION ONE

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Percolation theory is a branch of probability theory which describes the behavior of clusters in a random graph, and it has many applications to material science such as immersion in a porous stone. Recently, craze formation in polymer materials is gaining attention as a new type of percolation phenomenon. The paper [2] shows that a large void corresponding to a craze of the polymer starts to appear by the process of coalescence of many small voids, which suggests that "percolation of nanovoids" is the key mechanism to initiate craze formation.

In this talk, I introduce a new percolation model motivated from the craze formation of polymer materials. For the sake of modeling the coalescence of nanovoids, this model focuses on clusters of holes in $\mathbb{R}^d$ as higher dimensional topological objects, while the classical percolation theory mainly studies clusters of vertices (i.e., 0-dimensional objects). More precisely, this model uses homology generators in dimension $d-1$ for representing the holes, and the behavior of clusters of those holes are studied. This talk is based on the paper [1].

## References

[1] Hiraoka, Y., Mikami, T.: Percolation on homology generators in codimension one. Preprint https://arxiv.org/abs/arXiv:1809.07490

[2] Ichinomiya, T., Obayashi, I., Hiraoka, Y.: Persistent homology analysis of craze formation. Phys. Rev. E. 95, 012504 (2017)

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