1116-57-832 **Michał Adamaszek**, **Henry Adams*** (adams@math.colostate.edu) and **Samadwara Reddy**.
Vietoris–Rips complexes of circles and ellipses.

Given a metric space X and a distance threshold $r > 0$, the Vietoris–Rips simplicial complex has as its simplices the finite subsets of X of diameter less than r. If X is a Riemannian manifold and r is sufficiently small then the Vietoris–Rips complex is homotopy equivalent to the original manifold, but little is known about Vietoris-Rips complexes for larger values of r even though they are used in applications of persistent homology. We show that as r increases, the Vietoris–Rips complex of the circle obtains the homotopy types of the circle, the 3-sphere, the 5-sphere, the 7-sphere, . . . , until finally it is contractible. Paradoxically, we show that the Vietoris–Rips complex of an arbitrarily dense subset of the ellipse need not be homotopy equivalent to the Vietoris-Rips complex of the entire ellipse. (Received September 14, 2015)