The topological Tverberg problem beyond prime powers

Florian Frick, Carnegie Mellon University

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Note: This talk begins with a pre-seminar (aimed at graduate students) at 3:30–4:00. The main talk starts at 4:10.

Given $d$ and $q$ the topological Tverberg problem asks for the minimal $n$ such that any continuous map from the $n$-dimensional simplex to $\mathbb{R}^d$ identifies $q$ points from pairwise disjoint faces. For $q$ a prime power $n$ is $(q - 1)(d + 1)$. The lower bound follows from a general position argument, the upper bound from equivariant topological methods. It was shown recently that for $q$ with at least two distinct prime divisors the lower bound may be improved. For those $q$ non-trivial upper bounds had been elusive. I will show that $n$ is at most $q(d + 1) - 1$ for all $q$. I had previously conjectured this to be optimal unless $q$ is a prime power. This is joint work with Pablo Soberón.