On the dynamics of derived from Kuperberg flows

Steven Hurder
University of Illinois at Chicago, USA

Abstract: We consider the dynamical properties of C^∞-variations of the flow on an aperiodic Kuperberg plug $\mathbb{K}$. Our main result is that there exists a smooth 1–parameter family of plugs $\mathbb{K}_\epsilon$ for $\epsilon \in (-a, a)$ and $a < 1$, such that:

1. The plug $\mathbb{K}_0 = \mathbb{K}$ is a generic Kuperberg plug;
2. For $\epsilon < 0$, the flow in the plug $\mathbb{K}_\epsilon$ has two periodic orbits that bound an invariant cylinder, all other orbits of the flow are wandering, and the flow has topological entropy zero;
3. For $\epsilon > 0$, the flow in the plug $\mathbb{K}_\epsilon$ has positive topological entropy, and an abundance of periodic orbits.