

## **Patterns in tri-block copolymers: double-bubbles, core-shells and a new partitioning problem**

Lia Bronsard

We study a nonlocal isoperimetric problem for three interacting phase domains, related to the Nakazawa-Ohta ternary inhibitory system which describes domain morphologies in a triblock copolymer. We consider global minimizers on the two-dimensional torus, in a limit in which two of the species have vanishingly small mass but the interaction strength is correspondingly large. In this limit there is splitting of the masses, and each vanishing component rescales to a minimizer of an isoperimetric problem for clusters in  $2D$ .

Depending on the relative strengths of the coefficients of the interaction terms we may see different structures for the global minimizers, ranging from a lattice of isolated simple droplets of each minority species to double-bubbles or core-shells. These results have led to a new type of partitioning problem that I will also introduce. These represent work with S. Alama, with X. Lu, and C. Wang, as well as with S. Vriend.