Crystallization results in mechanics and collective behaviour

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We will present variational approaches to crystallization in two dimensions. First, we will discuss classical pairwise interaction potentials leading to microscopic crystallization and hexagonal Wulff shapes. Then, we will show that potantials with non integrable tails may lead to round Wulff shapes minimizing fractional perimeters. Finally, we will discuss how this kind of analysis can be adapted to deal with problems arising in collective behaviour with possible applications to fish schooling .