1011-49-97 **Peter J Sternberg*** (`sternber@indiana.edu`), Department of Mathematics, Rawles Hall, Indiana University, Bloomington, IN 47405, and **Rustum Choksi**. *Periodic phase separation: the periodic Cahn-Hilliard and isoperimetric problems.*

We consider here two well-known variational problems associated with the phenomenon of phase separation: the isoperimetric problem and minimization of the Cahn-Hilliard energy. The two problems are related through a classical result in Gamma-convergence and we explore the behavior of global and local minimizers for these problems in the periodic setting. More precisely, we investigate these variational problems for competitors defined on the 2 or 3-torus. We view these two problems as prototypes for periodic phase separation. (Received August 17, 2005)