

**Meeting:** 1004, Bowling Green, Kentucky, SS 13A, Special Session on Nonlinear Analysis and Applied Mathematics

1004-46-202      **Almut Burchard\*** (burchard@virginia.edu), Department of Mathematics, Kerchof Hall, Cabell Drive, Charlottesville, VA 22903, and **Yan Guo**, Division of Applied Mathematics, Box F, Providence, RI 02912. *Compactness via Symmetrization.*

We consider two types of translation-invariant functionals on  $\mathbb{R}^n$  which are known to satisfy sharp rearrangement inequalities. The functional  $\mathcal{I}$  is a convolution integral such as the Coulomb energy, and  $\mathcal{J}$  is a convex gradient functional such as the  $W^{1,p}$ -norm. Given a sequence of functions  $f_j$  whose symmetric decreasing rearrangements  $f_j^*$  converge to some limiting function  $g$ . We show that the functions  $f_j$  themselves converge to  $g$  up to translations, provided that either  $\mathcal{I}(f_j) \rightarrow \mathcal{I}(g)$  or  $\mathcal{J}(f_j) \rightarrow \mathcal{J}(g)$ . These compactness results lead to applications in variational problems and stability problems in stellar dynamics. (Received January 24, 2005)