Douglas P. Hardin, Edward B. Saff and Oleksandr V. Vlasiuk*
(oleksandr.vlasiuk@vanderbilt.edu), Vanderbilt University, Department of Mathematics, 1326 Stevenson Center, Nashville, TN 37240. Generating point configurations via hypersingular Riesz energy with an external field.

For a compact $d$-dimensional rectifiable subset of $\mathbb{R}^p$ we study asymptotic properties as $N \to \infty$ of $N$-point configurations minimizing the energy arising from a Riesz $s$-potential $1/r^s$ and an external field in the hypersingular case $s \geq d$. Results on separation and covering properties of such discrete minimizers are given. Formulas for the weak$^*$ limit of normalized counting measures and the first-order asymptotic values of minimal energy are obtained. As an application, we derive a method for generating configurations whose normalized counting measures converge to a given absolutely continuous measure supported on a rectifiable subset of $\mathbb{R}^p$. Our theorems are illustrated with several numerical examples. (Received September 19, 2016)