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(oleksandr.vlasniuk@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  $N \rightarrow \infty$  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)