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**Sylvia Serfaty\***, 4 place Jussieu, Paris, France. *Questions of crystallization in systems with Coulomb and Riesz interactions.*

We are interested in systems of points with Coulomb, logarithmic or more generally Riesz interactions (i.e. inverse powers of the distance). They arise in various settings: an instance is the classical Coulomb gas which in some cases happens to be a random matrix ensemble, another is vortices in the Ginzburg-Landau model of superconductivity, where one observes in certain regimes the emergence of densely packed point vortices forming perfect triangular lattice patterns named Abrikosov lattices, a third is the study of Fekete points which arise in approximation theory. After rescaling we deal with a microscopic quantity, the associated empirical point process, for which we give a large deviation principle whose rate function is the sum of a relative entropy and of a renormalized energy that governs microscopic patterns of points. The former favors disorder, while the latter is expected to favor crystalline configurations. This is based on joint works with Etienne Sandier, Simona Rota Nodari, Nicolas Rougerie, Mircea Petrache, and Thomas Leblé. (Received January 20, 2015)