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Exact Solution of the Spherical Spin Glass Model Beyond Mean Field Theory SHIMUL AKHANJEE, RIKEN - Condensed Matter Theory Laboratory, JOSEPH RUDNICK, UCLA Dept. of Physics — We present an exact solution of a Gaussian spin-glass model with infinite ranged interactions and a global spherical constraint at zero magnetic field. The replicated spin-glass Hamiltonian is mapped onto a Coulomb gas of logarithmically interacting particles confined by a peculiar single particle potential. The precise free energy is obtained by analyzing the Painlevé $\tau^{IV}[n]$ function in the $n \to 0$ limit, accounting for neglected fluctuations beyond the semi-circle density utilized in the large N analysis of Kosterlitz, Thouless and Jones[**?**]. This is the first known exact solution of a spin-glass model beyond mean-field theory.

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