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The Antiferromagnetic SO(3) Heisenberg Quantum Spin-Glass with Short Range Interaction EDUARDO MARINO, Princeton University , CARLOS CONCEICAO, UFRJ — We study the quenched disordered magnetic system which is obtained from the 2D SO(3) quantum Heisenberg model, with nearest neighbors interaction, by taking the random values of the exchange couplings as given by a Gaussian probability distribution centered in a value of the coupling that corresponds to anti-ferromagnetic order. Using coherent states, we map this system onto a generalization of the SO(3) nonlinear sigma model, containing different flavors, which correspond to the replicas and a quartic interaction. We then integrate over the transverse components and perform a mean-field calculation of the free energy density in the limit of zero replicas. The phase diagram of the system is then obtained and shows a critical curve, starting at a quantum critical point at T=0 separating a paramagnetic from a spin-glass phase. The stability of the phases is demonstrated by an analysis of the Hessian matrix of the free energy.

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