Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Magnetic Transition in Antiferromagnetic Spin-$\frac{1}{2}$ Chains with Staggered Long-Range Interactions NICOLAS LAFLORENCIE, University of British Columbia, IAN AFFLECK, University of British Columbia, MONA BERCIU, University of British Columbia — Antiferromagnetic spin-$\frac{1}{2}$ chains with non-frustrated long-range couplings are studied using the powerful Quantum Monte Carlo algorithm based on a Stochastic Series Expansion of the partition function [1]. The case of power-law decaying interaction $J(r) = -(-1)^r r^{-\alpha}$ is investigated for the general one-dimensionnal XXZ Hamiltonian

$$\mathcal{H} = \sum_{i,j} J(|i-j|) \left(S_i^x S_j^x + S_i^y S_j^y + \Delta S_i^z S_j^z \right).$$

Very large scale numerical results obtained on systems up to $L = 8000$ spins are compared and discussed through bosonization and spin-waves predictions [2] for the onset of antiferromagnetic ordering in the ground-state in function of β.
[1] O. F. Syljuåsen and A. W. Sandvik, Phys. Rev. E **66**, 046701 (2002).
[2] E. Yusuf, A. Joshi, and Kun Yang, Phys. Rev. B **69**, 144412 (2004).

Nicolas Laflorencie
University of British Columbia

Date submitted: 01 Dec 2004 Electronic form version 1.4