Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Molecular spin clusters for quantum computation MARCO AFFRONTE, CNR-INFM-S3 — Molecular spin clusters are prototypical systems exhibiting coherent dynamics of the electronic spin. The pattern of the lowest lying spin states is well defined and controlled at the synthetic level. The chemical bottom up approach used for the synthesis of molecules also allows to reduce intrinsic sources of decoherence and to build links between clusters, thus creating entanglement of spin states. Molecular spin clusters can be deposited at surfaces, thus forming scalable networks. Different molecules and ligands may be combined to exploit different functionalities, the latter being defined at molecular level. These facts provide extraordinary motivation to attempt the implementation of molecular quantum processors that, in turns, are test bench for novel quantum algorithms. Recent achievements obtained on antiferromagnetic molecular rings will be presented.

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Date submitted: 02 Dec 2007 Electronic form version 1.4