MAGNETISM OF 2D AND 3D FRUSTRATED SYSTEMS

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In the last few years, new physics has been shown to occur in fully frustrated lattices such as Kagomé or pyrochlore lattices: various types of behaviors are obtained, depending on the details of interactions; a short review of the possible, and eventually observed in some compounds, ground states will be given: quantum spin 1/2 systems exhibit a quantum spin liquid ground state with a spin gap, but a continuum of low energy singlet states; classical spins do not order and the ground state is infinitely degenerate; effect of anisotropy is quite important and leads to spin-ice behavior; "order by disorder" due to quantum or classical spin fluctuations may occur in some cases. Moreover any small perturbation (for example dipolar interaction) may change completely the physics of the system.
New results related to the effect of Dzyaloshinsky-Moriya interactions (DMI) will be presented. It will be shown that DMI are always allowed in these structures due to the low local symmetry; the effect on DMI on the ground state changes completely the nature of the ground state; magnetic ordering occurs due only to DMI. Possible application of the model to Fe and Cr jarosites with the kagomé structure will be presented. This would be the 1^{st} example of a magnetic transition induced by DMI.

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Invited paper

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