NMR in correlated electron systems: Cuprates, cobaltates, fullerides...

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Electron correlations in metallic systems induce quite unusual properties at variance with those expected for a Fermi liquid. Such systems display diverse competing ground states which depend sensitively on external parameters, such as doping, pressure etc... The resulting phase diagrams can be somewhat complicated with insulator to metal transitions, superconductivity, charge or spin ordering etc... In these lectures I shall insist on the fact that NMR, an experimental technique altogether sensitive to charge order, to static and dynamic magnetic properties, provides very powerful means to study the electronic properties of such systems and to sort out generic properties from those linked with specific material problems. Some of the important aspects revealed initially by NMR, such as the occurrence of a pseudogap in the phase diagram of High Tc cuprates, of charge disproportionation in highly doped Na coaltates will be taken as illustrations of the NMR capabilities. Emphasis will be given on the information which can be gained from the study of the incidence of impurities and controlled disorder on the physical properties of correlated electron systems. Finally, studies of the electronic dynamic magnetic properties through spin lattice T_1 NMR measurements will be illustrated in various cases, such as cuprates, cobaltates and at the Mott transition in alkali doped fullerides.