Band Theory of Correlated Electron Systems

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A review will be given of the self-interaction corrected local spin density (SIC-LSD) method to describe the electronic and magnetic properties of strongly correlated d and f electron systems. Applications of the method for the determination of the valency of rare earths and actinides will be presented. Recent results on the metal/insulator transition in YBCO, half metallicity of Sr_2FeMoO_6 and orbital ordering in $LaMnO_3$ will be discussed.