MODELLING CHARGE, ORBITAL AND MAGNETIC ORDER IN La$_{1-x}$Sr$_x$MnO$_4$ MONOLAYER MANGANITES

Krzysztof Rościszewski$^a$ and Andrzej M. Oleś$^{a,b}$

$^a$Marian Smoluchowski Institute of Physics, Jagellonian University,
Reymonta 4, PL-30059 Kraków, Poland
$^b$Max-Planck-Institut FKF, Heisenbergstrasse 1, D-70569 Stuttgart, Germany

The model which describes correlated $e_g$ electrons in doped, monolayer manganites [1] was recently studied by using correlated wave functions [2]. The effective Hamiltonian [3] takes into account: the kinetic energy of $e_g$ electrons, the crystal-field splitting between $x^2−y^2$ and $3z^2−r^2$ orbitals, on-site Coulomb interactions, the interaction between $e_g$ electrons and core $S = 3/2$ spins due to $t_{2g}$ electrons, antiferromagnetic superexchange interaction between core spins, and finally the coupling between $e_g$ electrons and Jahn-Teller modes. We have demonstrated that this model is in general capable of reproducing the phase situation in monolayer manganites [3]. Quite recently, it was found [4] that the splitting between the occupied and empty $e_g$ states at every site is quite large in La$_{1-x}$Sr$_x$MnO$_4$ (exceeding by far any previous estimates) and here we investigate the reasons and physical consequences of this large splitting.


Subject category :
1. Strongly Correlated Electrons and High Temperature Superconductivity

Presentation mode :
poster

Corresponding author :
Krzysztof Rościszewski

Address for correspondence :
Marian Smoluchowski Institute of Physics
Jagellonian University
Reymonta 4
PL-30059 Kraków
Poland

Email address :
krzysztof.rosciszewski@uj.edu.pl