Abstract Submitted
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Non-Collinear Magnetic Orderings in Mott Insulators ALEXANDER BAZHAN[1], P.L. Kapitza Institute for Physical Problems, RAS, — Non-collinear magnetic orderings of four Cu magnetic moments in Mott insulators Rd_2CuO_4(R =Nd, Pr) of I4/mmm symmetry and associated magnetic phase transitions are of interest in studies of transformations, when correlated electron-hole carriers are introduced in $R_{2-x}Ce_xCuO_{4\pm\delta}$. Orderings are determined by thermodynamic potential in representation by antiferromagnetic $\mathbf{l}_1$, $\mathbf{l}_2$ and magnetic $\mathbf{m}$ vectors, with orderings of $\mathbf{l}_1$, $\mathbf{l}_2$ vectors along [100] , [010] axis,with values $\mathbf{l}_1^2 = \mathbf{l}_2^2 = 1/2\ \mathbf{l}_0^2$, [1], which can be presented as, $\Phi = 1/2\ A(\ \mathbf{l}_1^2 + \mathbf{l}_2^2) + 1/2\ A_3\mathbf{l}_3^2 + 1/2\ B\mathbf{m}^2 + 1/2\ D\ [(\mathbf{l}_1\mathbf{m})^2 + (\mathbf{l}_2\mathbf{m})^2] + 1/2\ D_3(\mathbf{l}_3\mathbf{m})^2 + 1/4\ I(\ \mathbf{l}_1^2 + \mathbf{l}_2^2)^2 + 1/4\ I_3\mathbf{l}_3^2 + 1/4\ E\ (\ \mathbf{l}_1^2 - \mathbf{l}_2^2)^2 + 1/4\ a\ (\ \mathbf{l}_{1z}^2 + \mathbf{l}_{2z}^2) + 1/4\ a\mathbf{l}_{3z}^2 - 1/4\ b_2[\ (\ \mathbf{l}_{1y}^2 + \mathbf{l}_{2x}^2) - (\ \mathbf{l}_{1x}^2 + \mathbf{l}_{2y}^2)\ ] - 1/4\ b_4[\ (\ \mathbf{l}_{1y}^2 + \mathbf{l}_{2x}^2)^2 + (\ \mathbf{l}_{1x}^2 + \mathbf{l}_{2y}^2)^2\ ] - \mathbf{mH}$ where $\mathbf{l}_3$=0. Magnetic phase transitions, are concerned with change of $\mathbf{l}_1$, $\mathbf{l}_2$ values in fields $\sim H_{c1}$, $\sim H_c$, where $\mathbf{l}_1^2$=0, $\mathbf{l}_2^2 = \mathbf{l}_0^2$, when field is oriented along [100], [110] axis respectively, and next $\mathbf{l}_2$rotation to orthogonal to field direction in fields $\sim H_{c2}$, when field is along [110] axis. Fields H_{c1}, H_c, H_{c2} are presented as, $H_{c1}^2 = 2BE\mathbf{l}_0^4$; $H_c^2 = H_{c1}H_{c2}$, if $H_{c2}^2 = b_2B\mathbf{l}_0^2$; $H_c^2 = \sqrt{2}\cdot H_{c1}H_{c2}$ if $H_{c2}^2 = b_4B\mathbf{l}_0^4$. Formation of charge density waves of checkerboard structure can be detected by studies of transformation of magnetic phase transitions and fields in $R_{2-x}Ce_xCuO_{4\pm\delta}$. [1]. A. N. Bazhan, AIP Proceedings 850 (2006) 1241

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