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R. Cherif[1,*], E. K. Hlil[2], M. Ellouze[1], F. Elhalouani[3] and S. Obbade[4]

[1]*Sfax University, Faculty of Sciences of Sfax, B. P. 1171 – 3000 Sfax, TUNISIA*

[2] *Institut Neél, CNRS et Université Joseph Fourrier, BP 166, F -38042 Grenoble Cedex 9, FRANCE*

[3]*Sfax University, National Engineering School of Sfax, LASEM, B. P. W – 3038 Sfax, TUNISIA*

[4]*LEPMI UMR 5279, CNRS - Grenoble INP - Université de Savoie - Université Joseph Fourier, 1130 rue de la Piscine, BP 75, 38402 Saint-Martin d'Hères Cedex, FRANCE*

Abstract

We report a study of the critical phenomena of perovskite-manganite compound $La_{0.6}Pr_{0.1}Sr_{0.3}MnO_3$ around the Curie temperature. Experimental results based on magnetic measurements using Banerjee criterion reveals that the sample exhibits a second-order paramagnetic-ferromagnetic transition. The critical behavior analysis and Kouvel-Fisher method suggests that the critical phenomena around the critical point can be correctly described by the 3D-Heisenberg model. Critical exponents were estimated and found $\beta = 0.354 \pm 0.009$ and $\gamma = 1.264 \pm 0.035$ at $T_C = 325.5 \pm 0.443$ K. The critical exponent δ is determined separately from the isothermal magnetization at T_C and evaluated to $\delta = 4.934 \pm 0.0004$. These critical exponents obey the Widom scaling relation $\delta = 1 + \gamma/\beta$. Based on the critical exponents, the magnetization-field-temperature (*M-H-T*) data around T_C collapses into two curves obeying the single scaling equation $M(H,\varepsilon) = |\varepsilon|^{\beta} f \pm \left(\frac{H}{|\varepsilon|^{\beta+\gamma}} \right)$ where $\varepsilon = (T - T_C)/T_C$ is the reduced temperature.