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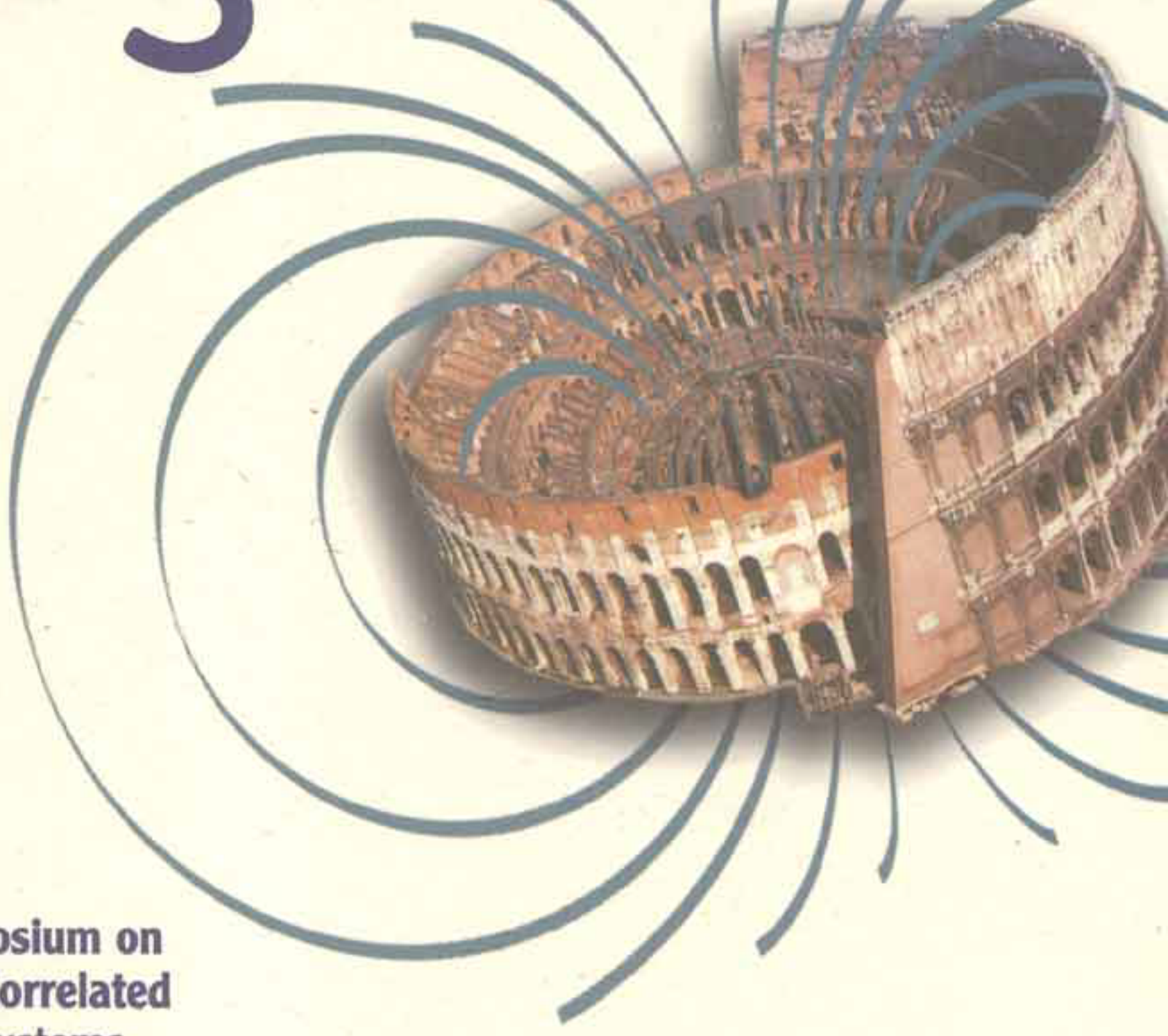

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abstracts

4R-pm-03—— ANISOTROPIC HYPERFINE FIELD FLUCTUATION IN $La_{0.67}Pb_{0.33}Mn_{1-x}{}^{57}Fe_xO_3$

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Observations of the colosscal magnetoresistance (CMR) and other intricate physical phenomena in the perovskite manganite oxides $R_{1-x}A_xMnO_3$ (R= La, Nd, Pr, Sn, Y; A= Ca, Sr, Ba, Pb) have triggered renewed attention to this class of materials. Polycrystalline samples of $La_{0.67}Pb_{0.33}Mn_{0.99}{}^{57}Fe_{0.01}O_3$ have been prepared with the aim of investigating the influence of the presence of the metal ^{57}Fe. Their magnetic and crystallographic properties are studied using Mössbauer spectroscopy and neutron dffraction. The structure of $La_{0.67}Pb_{0.33}MnO_3$ was found to be rhombohedral, with lattice constants a_0 = 5.4932 Å and α = 60.207 °. The lattice constants a_0 of the samples became almost similar with increasing ^{57}Fe contents ($0.01 \leq x \leq 0.05$). However, the lattice constants α increased. Increased ^{57}Fe contents dropped rapidly the magnetization and the Curie temperature (T_c). This results show that Fe favours an antiferromagnetic coupling in the Mn-O layer, and finally it leads to weaking of the ferromagnetic double exchange coupling. Also our magnitic structure neutron diffraction refinements support above results. Mössbauer spectra of $La_{0.67}Pb_{0.33}Mn_{0.99}{}^{57}Fe_{0.01}O_3$ were taken at various temperatures ranging from 14 to 350 K. As the temperature increased towards T_c= 340 K, line broadening and 1, 6 and 3, 4 line width differences occurred because of anisotropic hyperfine field fluctuation. The anisotropic field fluctuation of $+H$ ($P_+ = 0.83$) was greater than $-H$ ($P_- = 0.17$). We also calculated the frequency factor and the anisotropy energy as 49.34 $\Gamma/\hbar$ and 383 erg/cm^3, respectively, using the relatively accurate data for T= 130 K that is associated with the large line broadening.