Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Nonextensivity in Magnetic Systems IVAN OLIVEIRA, DIOGO
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Physics, MARIO REIS, Ciceco - Aveiro University — Nonextensive statistics has
been successfully applied to different areas of physics, whenever long-range cor-
relations, fractality, inhomogeneity or long time memory are present. Nonex-
tensive thermodynamics is derived from the definition of nonextensive entropy:
$S_q = k(1 - \sum_i p_i^q)/(q - 1)$, where p_i are probabilities and q is the so-called entropic
index. From this definition one obtains the q-density matrix, ρ^q and, from it, ther-
modynamically related quantities. In condensed matter, strong correlated systems
are good candidates to be approached from the nonextensive formalism. This is the
case of manganese oxides, or manganites. They are magnetically inhomogeneous
and present fractal grain structure. In the present work we discuss various features
which are observed in manganites and, from experimental data, we give a physical
interpretation for the entropic index q and calculate various aspects of the mag-
netism of different samples, such as the magnetic susceptibility and phase diagram.
We also discuss magnetic elementary excitations in inhomogeneous media using the
nonextensive approach.

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Date submitted: 23 Nov 2007   Electronic form version 1.4