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The impact of finite size effects on spin waves in CoO¹
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NATIONAL LABORATORY COLLABORATION, STONY BROOK UNIVER-
SITY TEAM — We studied the spin waves in nanoscaled CoO using inelastic neu-
tron scattering. The zero-field measurements were carried out on Co/CoO nanopar-
ticles, CoO nanoparticles, and the bulk powder of CoO in the temperature range of
15 – 300 K. The temperature-dependent inelastic intensity at 2.5 meV, found in all
samples, was ascribed to CoO spin waves. We observed an increase at least of factor
of 100 in the inelastic intensity for Co/CoO as compared to the CoO bulk, and shift
of intensity towards larger scattering vectors. We suggest that new boundary con-
ditions imposed by the nanoparticle surface and the breaking of the symmetry are
mainly responsible for this effect. Similar enhancement of the spin wave spectrum
was also predicted in thin films [1,2]. [1] S. Reshetnyak et al PMC Physics B 2008
[2] Y.Gorobets et al, Tech. Phys. 1998

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