**Magnetoelectric Effect Enhanced by Breaking the**

**Geometric Magnetic Frustration in LuMn1+zO3+δ**

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A comprehensive insight of the structural and properties effects due to controlled off-stoichiometry in the LuMn1+zO3+δ (**z** = -0.02; **δ** ~ 0) hexagonal manganite is supported by Neutron Powder Diffraction measurements confirming single phase hexagonal structure and exposing, below TNéel ~90K, a pertinent ferromagnetic component which breaks the archetypal geometrical frustrated antiferromagnetic state ascribed for the utter LuMnO3 compound [1]. The evaluated triangular disposition of spins prompts an electric polarization contribution [2] and a clear enhancement the magnetoelectric effect [3]. In addition, Raman spectroscopy, dielectric, pyroelectric and magnetic measurements as function of temperature enabled to recognize intrinsic interaction between structural, transport and magnetic contributions, well above Néel transition.

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**Fig. 1. Diagram of the basal plane of the LuMnO3 and the local disturbance prompt by a Mn vacancy in the antiferromagnetic geometric frustration.**

**References**

[1] S. Lee, et al., Nature 451, (2008) 805.

[2] L. N. Bulaevskii et al., Physical Review B 78, (2008) 024402

[3] I. V. Solovyev, M. V. Valentyuk, V. V. Mazurenko, Phis. Review B 86, (2012) 054407.