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PII: S0925-8388(18)33411-X

DOI: [10.1016/j.jallcom.2018.09.171](https://doi.org/10.1016/j.jallcom.2018.09.171)

Reference: JALCOM 47590

To appear in: *Journal of Alloys and Compounds*

Received Date: 2 July 2018

Revised Date: 11 September 2018

Accepted Date: 15 September 2018

Please cite this article as: R.R. Das, P.N. Lekshmi, S.C. Das, P.N. Santhosh, Competing short-range magnetic correlations, metamagnetic behavior and spin-phonon coupling in Nd<sub>2</sub>CoMnO<sub>6</sub> double perovskite, *Journal of Alloys and Compounds* (2018), doi: <https://doi.org/10.1016/j.jallcom.2018.09.171>.

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**Competing short-range magnetic correlations, metamagnetic behavior and spin-phonon coupling in  $\text{Nd}_2\text{CoMnO}_6$  double perovskite**

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**Abstract:**

We report the presence of ferromagnetic short-range interactions, metamagnetic transitions and spin-phonon coupling on monoclinic polycrystalline  $\text{Nd}_2\text{CoMnO}_6$  double perovskite. DC thermomagnetic characterization shows a paramagnetic to ferromagnetic transition at  $T_{C1} \sim 168$  K and further to a cluster glass like magnetic transition at  $T_{C2} \sim 135$  K. Griffiths phase like features are also observed, attributed to the presence of competing magnetic interactions. Step like nature observed in the virgin curves of magnetic isotherms implies the presence of meta-magnetic features. Additionally, temperature evolution of Raman spectra signatures spin-phonon coupling extending up to Griffiths like phase region indicating the possibility of magneto-electric coupling in  $\text{Nd}_2\text{CoMnO}_6$ .

**Keywords:**  $\text{Nd}_2\text{CoMnO}_6$ , ferromagnetism, Griffiths like phase, metamagnetism, spin-phonon coupling

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