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Ferromagnetic quantum criticality in $Sm_{1-x}La_xNiC_2$ (x=0.85, 0.92 and 0.96) WONJUN LEE, SUHEON LEE, Chung-Ang University, TUSON PARK, Sungkyunkwan University, K.-Y. CHOI, Chung-Ang University — We report SR experiments on the ternary compounds $Sm_{1-x}La_xNiC_2$ (x=0.85, 0.92, and 0.96), possessing a non-centrosymmetric orthorhombic $CeNiC_2$ structure (Amm2). The end members of these compounds have the ferromagnetic (FM) and charge-density-wave states at x=0 and the superconducting (SC) state at x=1. A FM quantum criticality (QC) is anticipated to occur around x=0.92. The x=0.96 SC sample exhibits a linear T dependence of the muon relaxation rate λ_{muon}, giving no indication of time-reversal symmetry breaking unlike the x=1 sample. ZF-SR measurements of the x=0.85 FM sample show a steep increase of λ_{muon} below 5 K without obvious muon-spin precession, suggesting the formation of an inhomogeneous, weak magnetic ordered state. Longitudinal field-SR experiments unveil an ordered volume fraction of about 56 %. For a case of the putative x=0.92 QC compound, the static fraction is decreased to 15 %, while λ_{muon} extracted from the ZF-SR spectra display "persisting spin dynamics". This suggests that the x=0.92 sample is close to QCP.

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