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Nonmagnetic impurity effects of the spin disordered state in NiGa_2S_4 ¹ YUSUKE NAMBU, SATORU NAKATSUJI, YOSHITERU MAENO, Department of Physics, Kyoto University — Nonmagnetic impurity effects of the spin disordered state in the triangular antiferromagnet NiGa_2S_4 [1] was studied through magnetic and thermal measurements for Zn substituted insulating materials $\text{Ni}_{1-x}\text{Zn}_x\text{Ga}_2\text{S}_4$ ($0.0 \leq x \leq 0.3$)[2]. Only 1 % Zn substitution is enough to strongly suppress the coherence observed in the spin disordered state. However, suppression is not complete and the robust feature of the quadratic temperature dependent specific heat and its scaling behavior with the Weiss temperature indicate the existence of a coherent Nambu-Goldstone mode. Absence of either conventional magnetic long-range order or bulk spin freezing suggests a novel symmetry breaking of the ground state. [1] Satoru Nakatsuji, Yusuke Nambu, Hiroshi Tonomura, Osamu Sakai, Seth Jonas, Collin Broholm, Hirokazu Tsunetsugu, Yiming Qiu and Yoshiteru Maeno, *Science* **309**, 1697 (2005). [2] Yusuke Nambu, Satoru Nakatsuji and Yoshiteru Maeno, preprint.

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