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[\[Physics\] NCKU Researcher Team's Findings on Higgs Transition of North and South Poles of Electrons in a Magnet Published in 《Nature Communications》](#)

[Physics] NCKU Researcher Team's Findings on Higgs Transition of North and South Poles of Electrons in a Magnet Published in 《Nature Communications》 ([Chinese Version](#))

NCKU News (2012/09/09) & Science Daily (2012/08/02) Minimal evidence of a Higgs transition of north and south poles of electron spins was observed in a magnet Yb₂Ti₂O₇ at the absolute temperature 0.21 K. A fractionalization of these monopoles from electron spins was observed on cooling to 0.3 K. On further cooling below 0.21 K, the material showed the ferromagnetism to be understood as a superconductivity of monopoles. The work is reported in an online science journal Nature Communications on August 7, by an international collaboration team of Dr. Shigeki ONODA (Condensed Matter Theory Lab., RIKEN Advanced Science Institute), Dr. Lieh-Jeng CHANG (Quantum Beam Science Directorate, Japan Atomic Energy Agency and Dept. of Physics, National Cheng Kung Univ.), and Dr. Yixi SU (Jülich Center for Neutron Science JCNS-FRM II, Forschungszentrum Jülich), and coworkers.

The principal investigator of the project Dr. Lieh-Jeng CHANG with the help of the neutron scattering spectrometer scientist from München, Germany, Dr. Yixi SU, uses the polarized neutrons in the reactor of FRM-II to conduct the experiment. The project is supported by National Synchrotron Radiation Research Center (NSRRC) and National Science Council (NSC). The experiment suggests that the model "quantum spin ice" developed by the team is plausible and has reached a conclusion that Higgs Transition temperature is 0.21 K.

The international research project has successfully integrated the experimental and theoretical results. Remarkably, the decisive role of the neutron scattering experiment in the project indicates the significance of the technology of neutron scattering in the advanced materials studies, especially in the research and development of nano- and quantum-materials.

Further Information:

[NCKU News 2012/09/05](#) (Chinese)

[Science Daily 2012/08/02](#)

[National Science Council International Cooperation Sci-Tech Newsbrief](#)

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