Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Magnetic precursor of the pressure-induced superconductivity in Fe-ladder compound[1] SONGXUE CHI, Quantum Condensed Matter Division, Oak Ridge National Laboratory, YOSHIYA UWATOKO, Institute for Solid State Physics (ISSP), University of Tokyo, HUIBO CAO, Quantum Condensed Matter Division, Oak Ridge National Laboratory, YASUYUKI HIRATA, Institute for Solid State Physics, The University of Tokyo, KAZUKI HASHIZUME, TAKUYA AOYAMA, KENYA OHGUSHI, Department of Physics, Graduate School of Science, Tohoku University — The pressure effects on the antiferromagentic orders in iron-based ladder compounds $CsFe_2Se_3$ and $BaFe_2S_3$ have been studied using neutron diffraction. With identical crystal structure and similar magnetic structures, the two compounds exhibit highly contrasting magnetic behaviors under moderate external pressures. In $CsFe_2Se_3$ the ladders are brought much closer to each other by pressure, but the stripe-type magnetic order shows no observable change. In contrast, the stripe order in $BaFe_2S_3$, undergoes a quantum phase transition where an abrupt increase of Néel temperature by more than 50% occurs at about 1 GPa, accompanied by a jump in the ordered moment. With its spin structure unchanged, $BaFe_2S_3$ enters an enhanced magnetic phase that bears the characteristics of an orbital selective Mott phase, which is the true neighbor of superconductivity emerging at higher pressures.

[1]Research at Oak Ridge National Laboratorys HFIR was sponsored by the Scientific User Facilities Division, Office of Basic Energy Sciences, U.S. Department of Energy.This work was supported by JSPS KAKENHI Grant Number 16H04019.

Songxue Chi
Quantum Condensed Matter Division, Oak Ridge National Laboratory

Date submitted: 10 Nov 2016 Electronic form version 1.4