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Intrinsic Josephson Junctions in the iron-based multi-band superconductor $(V_2Sr_4O_6)Fe_2As_2$ PHILIP MOLL, Solid State Physics, ETH Zurich, Switzerland, XIYU ZHU, PENG CHENG, HAI-HU WEN, Center for Superconducting Physics and Materials, Nanjing University, China, BATLOGG BERTRAM, Solid State Physics, ETH Zurich, Switzerland — We have observed clear experimental evidence for intrinsic Josephson junction (iJJ) behavior in the iron-based superconductor $(V_2Sr_4O_6)Fe_2As_2$ ($T_c \approx 20K$). The iJJs are identified by periodic oscillations of the flux flow voltage for out-of-plane (c-axis) currents upon increasing a well aligned in-plane magnetic field. Their periodicity is well explained by commensurability effects between the Josephson vortex lattice and the crystal structure, which is a hallmark signature of Josephson vortices confined into iJJ stacks. Essential for reliable c-axis transport measurements on the available microcrystals are Focused Ion Beam microstructuring and contacting techniques. The insulating temperature behavior of ρ_c indicates S-I-S type junctions. This finding adds $(V_2Sr_4O_6)Fe_2As_2$ as the first iron-based, multi-band superconductor to the copper-based iJJ materials of interest for Josephson junction applications, and in particular novel devices based on multi-band Josephson coupling may be realized.

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