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Highly Mobile In-plane Vortex Arrangement in SmFeAs(O,F)[1] PHILIP MOLL, Laboratory for Solid State Physics, ETH Zurich, Switzerland, LUIS BALICAS, National High Magnetic Field Laboratory, Tallahassee, FL, USA, JANUSZ KARPINSKI, NIKOLAI D. ZHIGADLO, BERTRAM BATLOGG, Laboratory for Solid State Physics, ETH Zurich, Switzerland — We observed a strong enhancement of flux flow dissipation for current flowing along the interplanar direction in single crystals of the iron pnictide high-T_c superconductor SmFeAs(O,F) ($T_c \sim 50$K) in high magnetic fields precisely aligned with the FeAs planes. The dissipation reaches significant fractions of the resistance in the normal state at all temperatures and fields, far below $H_{c2}||ab$, estimated to be well above 100T at low temperatures. Even slightest field misalignments from the FeAs planes (<0.1deg) restore the dissipation free state characterized by very high critical current densities ($\sim 10^6 A/cm^2$) at low temperatures. We attribute this feature to vortices arranging themselves between the FeAs layers, accompanied by a reduced effectiveness of pinning. The qualitative features are reminiscent of the well-known lock-in effect in the cuprates, yet there are clear differences evident: The angular range of enhanced dissipation is reduced upon cooling in SmFeAs(O,F), whereas in the cuprates it significantly broadens as H_{c1} increases at lower temperatures. Furthermore, the lock-in effect is most pronounced in strongly anisotropic materials, while SmFeAs(O,F) is moderately anisotropic ($\gamma \sim$ 6-8), becoming more isotropic at low temperature.

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