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[Invited] LOW TEMPERATURE- HIGH FIELD PERFORMANCES OF IRON CALCHOGENIDES THIN FILMS

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Among the various families of Fe-based superconductors, iron chalcogenides, while present a transition temperature not particularly high, show great advantages for potential applications in high field, albeit at liquid helium temperature.

In thin films, the strain can push the critical temperature up to 21K, the critical field up to more than 50 T and the irreversibility field close to this value.

The critical current and its anisotropy heavily depend on the type of substrate used for the deposition. It is possible to reach values up to 1 MA/cm² at liquid helium temperatures and self-field with weak magnetic field dependence and without appreciable anisotropy. In this study, we will show what are the defects acting as pinning centers for different substrates and how the shape of the pinning centers determines the anisotropic observed currents.

Finally, in the case of STO, we present the first measurements on FeSeTe thin films deposited on bi-crystals showing that, differently from HTS, the high angle grain boundary is less limiting the supercurrent. Experiments indicate that the current is not appreciably depressed up to a misorientation angle of 10 degrees.

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