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## **M2Or1B-02: [Invited] Methods to enhance and tune vortex pinning in coated conductors**

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At liquid He temperatures and low magnetic fields, ReBCO films and coated conductors (CC) can have extremely large critical current densities ( $J_c$ ), in excess to  $100 \text{ MA/cm}^2$ , the highest among known superconductors, making CCs very attractive for power applications. However,  $J_c$  tends to decrease sharply as either  $T$  or  $H$  increases, thus additional pinning centers must be introduced to increase it to useful levels at technologically relevant  $T - H$  conditions. Through the contributions of many research groups, a good understanding of the processing-properties correlations in CCs has been obtained, and a variety of routes to enhance vortex pinning has been developed. In this talk I will review the basics of the pinning properties associated to the different types of disorder and discuss some of our recent results as examples. By film growth conditions manipulation, addition of second phases, and thermal treatments, we can not only increase  $J_c$  but also tune it for the requirements of specific applications. Our characterization toolkit includes imaging of defects and detailed  $J_c(T, H, \Theta)$  measurements, with emphasis in the dependence of  $J_c$  on the orientation of the magnetic field ( $\Theta$ ). We also investigate the influence of the fast vortex dynamics that occurs because of the strong thermal fluctuations of vortices in HTS, which results in time decays of the supercurrents due to flux creep effects, and significant dissipation below  $J_c$ .

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