

# Technology of wires, tapes and superconducting cables

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- 1. Introduction to superconductivity: I and II type superconductors; upper critical field; irreversibility field; pinning centers; critical current
- 2. Properties of superconducting materials for applications: low Tc superconductors: Nb-Ti, A15 (Nb<sub>3</sub>Sn); high-Tc superconductors: YBCO, Bi-family (Bi-2223 and Bi-2212); MgB<sub>2</sub>; Fe-based superconductors
- 3. Techniques for manufacturing superconductors for applications: powder-In-Tube for wires and tapes; technologies for the manufacture of Coated Conductor (IBAD, RABiTS); technologies for the manufacture of cables (Rutherford, Roebel, CICC, CORC....)
- 4. Analysis of losses in AC regime in a superconductor; hysteresis losses; coupling losses; losses from eddy currents; techniques for their reduction
- 5. Performances achieved by technological superconductors: fields of applicability; real applications made; future perspectives
- 5. Laboratory experiences c / o CNR-SPIN and DIFI
- 6. Visit to ASG Superconductors / Columbus superconductors SpA