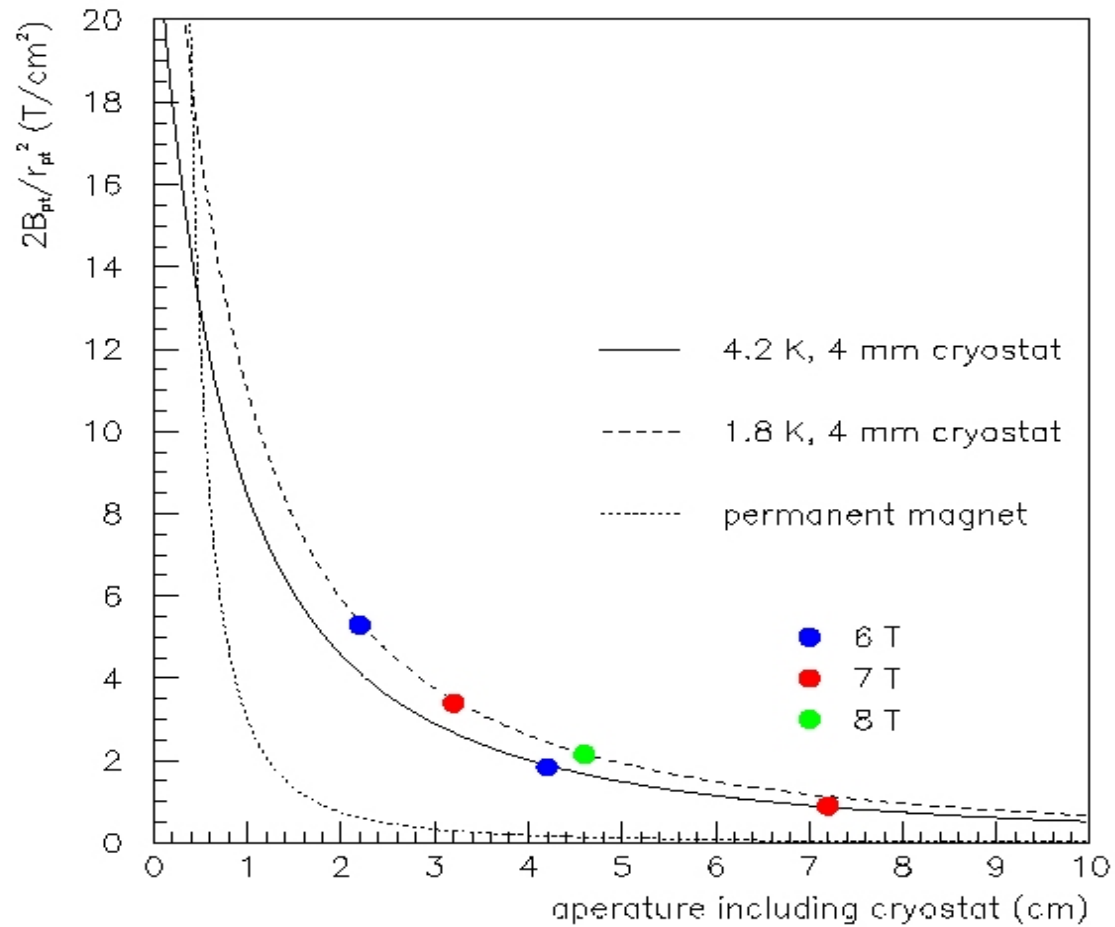


PERMANENT & SC 6POLES



WHICH SC

- LTS

LIQUID HELIUM

NbTi: reliable, relatively cheap (1.4 Eu/m/mm²)

Nb₃Sn: heat treatment, above 12 T, expensive

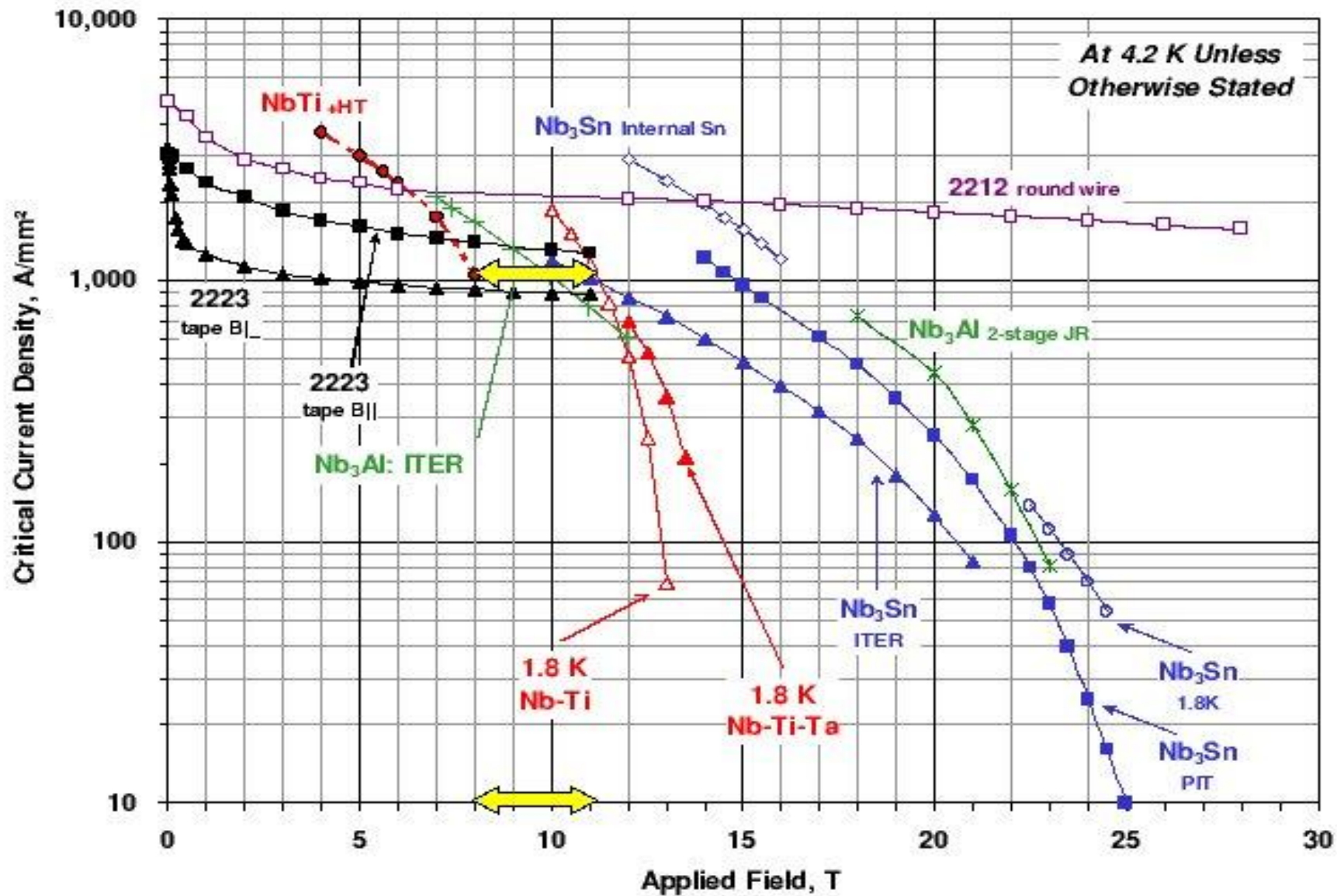
- HTSC

LIQUID HELIUM – CRYOCOOLER (NO LN₂)

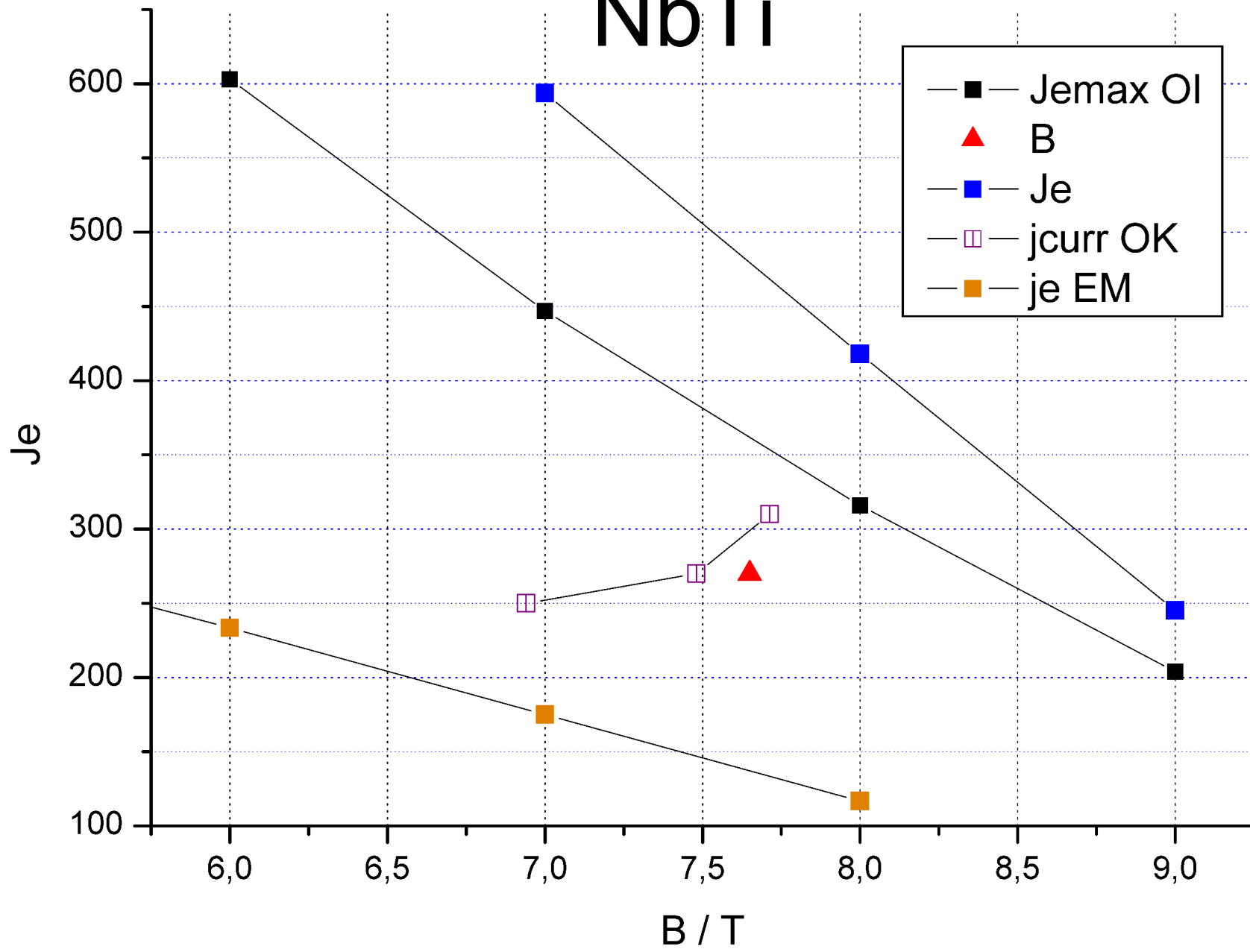
QUENCH PROTECTION

BISCCO Relatively cheap (10-60 Eu/m/mm²)

MgB₂ relative low temperature (10-30K), cheap,
wires/tapes, under development



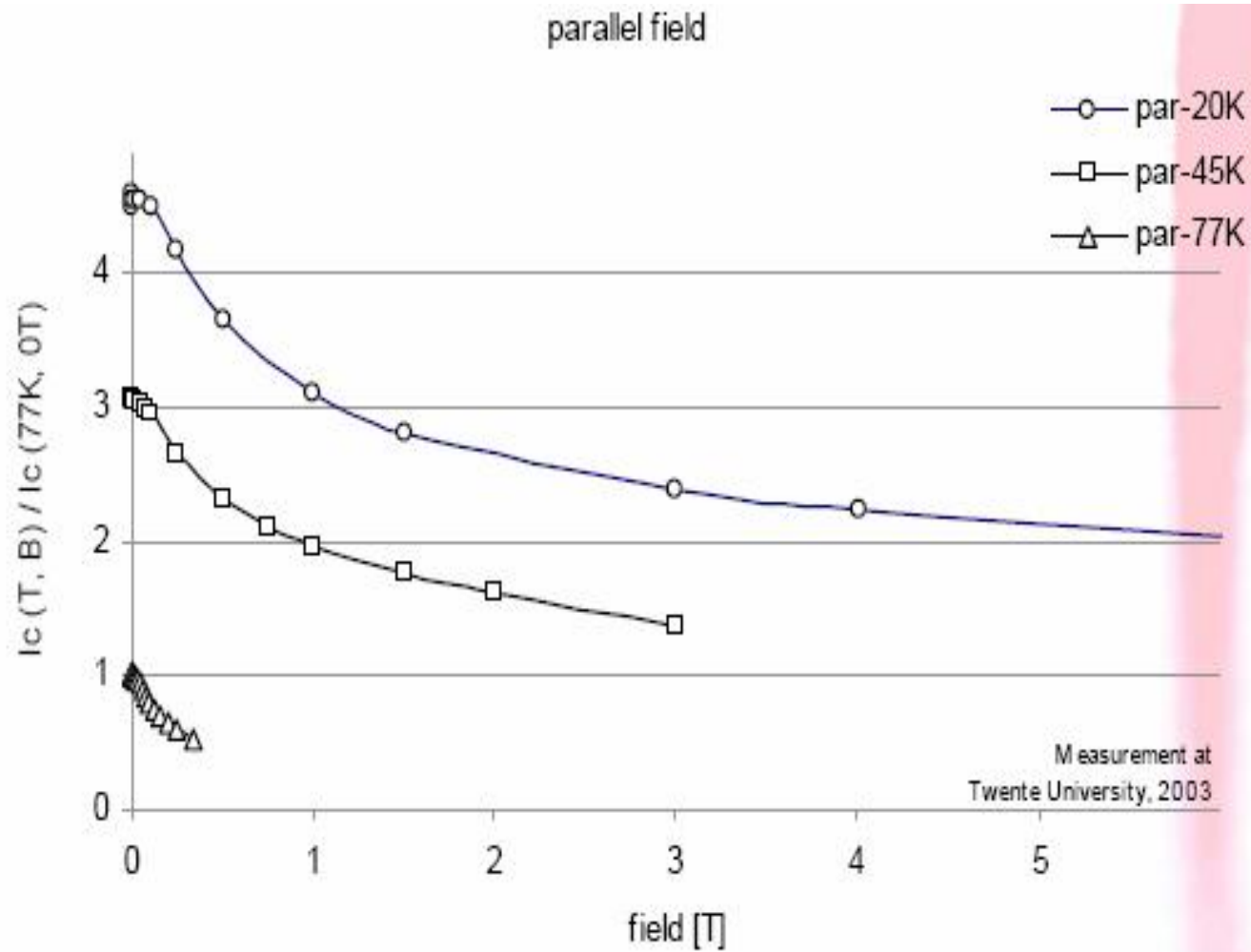
NbTi



BSCCO TAPES

Cryogen free system
cryocoolers

Material	Material of superconducting filaments Matrix material Reinforcement material	BSCCO ceramic Ag alloy Stainless steel lamination	→ 107 A/mm ²
Superconducting Properties	Critical Current	115 A, 125 A, 135 A, 145 A (1 μV/cm criterion, 77 K, in self-field)	
Dimensions	Width Thickness	4.2 mm ... 4.4 mm average 0.255 mm ... 0.285 mm average	
Typical Mechanical Properties	Axial tensile strength (95% I _c retention) Double bending, critical radius (95% I _c retention) Tensile Strain (95% I _c retention)	200 MPa at 300 K 250 MPa at 77 K 40 mm 0.4% at 77 K	
Delivery Lengths	Delivery length (single piece)	100 m, 200m, 400 m	
Electrical Insulation (optionally available)	Material Insulation thickness (withstand voltages at 77 K)	- Polyethylenterephthalat- Polyester: 20 μm (<1 kV) - Polyimide: 60 μm (>1 kV)	

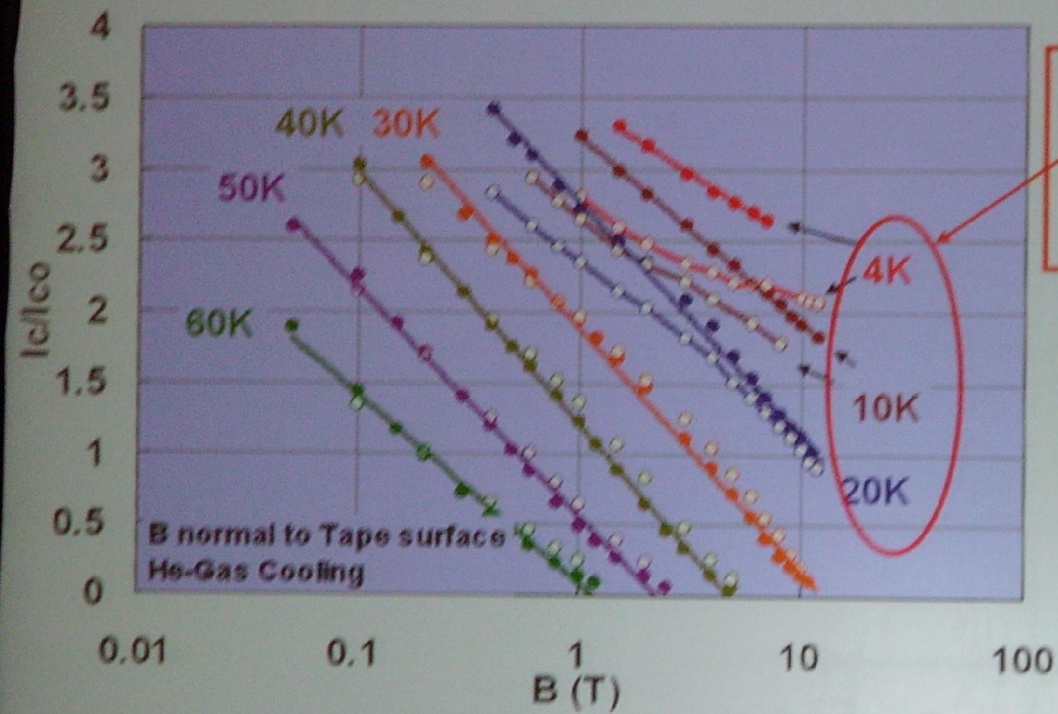


Trithor GMBH 2007

SUMITOMO 2007

$I_c(B, T)$ relation (1)

the relationship between the normalized I_c / I_{c0} and the applied magnetic field (I_{c0} : I_c value at 77 K, self-field)

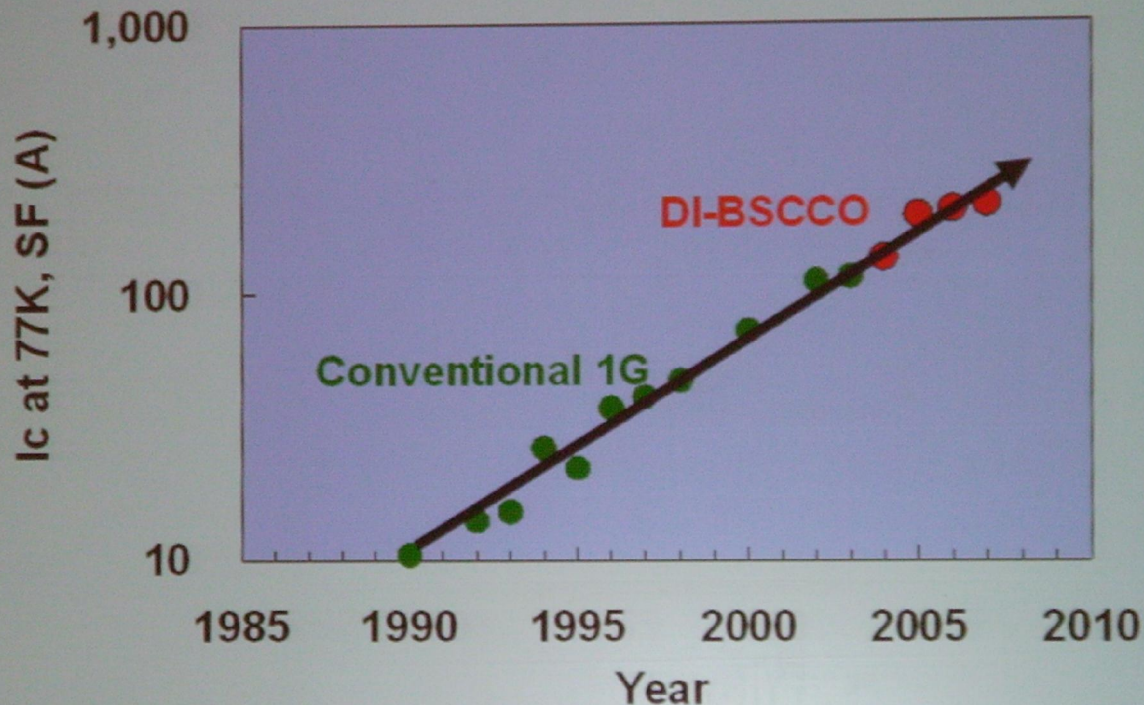


the increase of I_c value (77 K, self-field) reduce weak grain connectivity, improve $I_c(B)$ values

29/08/2007

SUMITOMO FUTURE

Progress in Ic



Next target "300A" can be attained by slight improvement of 2223 [29/08/2007](#)

COLUMBUS MgB_2

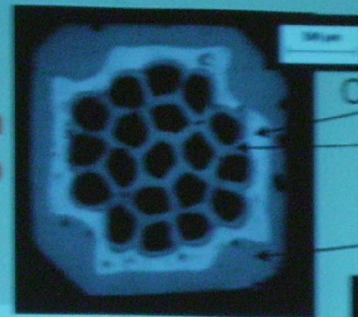
Optimisation of the wires fabrication by varying sheaths, geometry of the conductor, ...

'Standard' Tape-14 filam-Cu stab



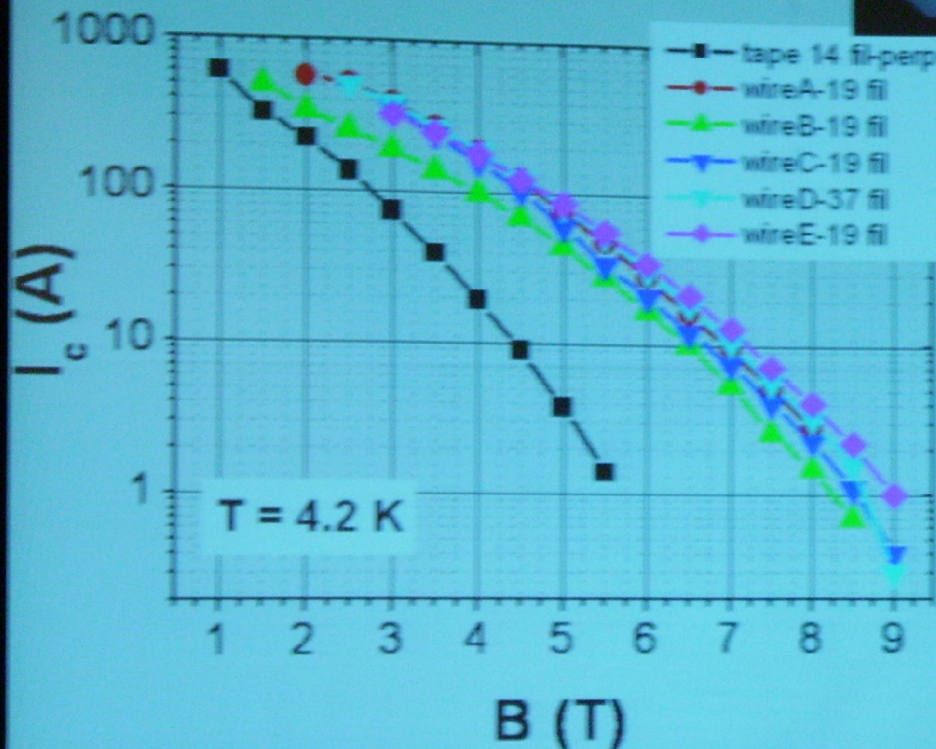
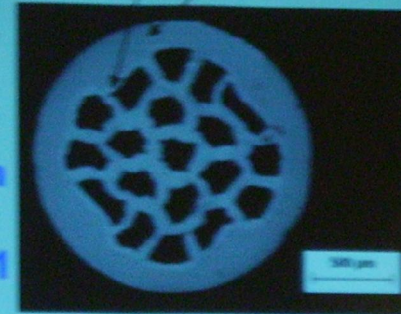
MgB_2 Cu Fe Ni

Wire B
37 filam
Cu stab



Ni
Monel

Wire C
19 filam
no Cu
up to 61



Going from flat tape to round-square wires cleans up conductor anisotropy, and the field dependence of I_c improves accordingly

30/08/2007