

High field performance of high strength Bi-2223 tape @4.2K

H. Kitaguchi (Unit Director)

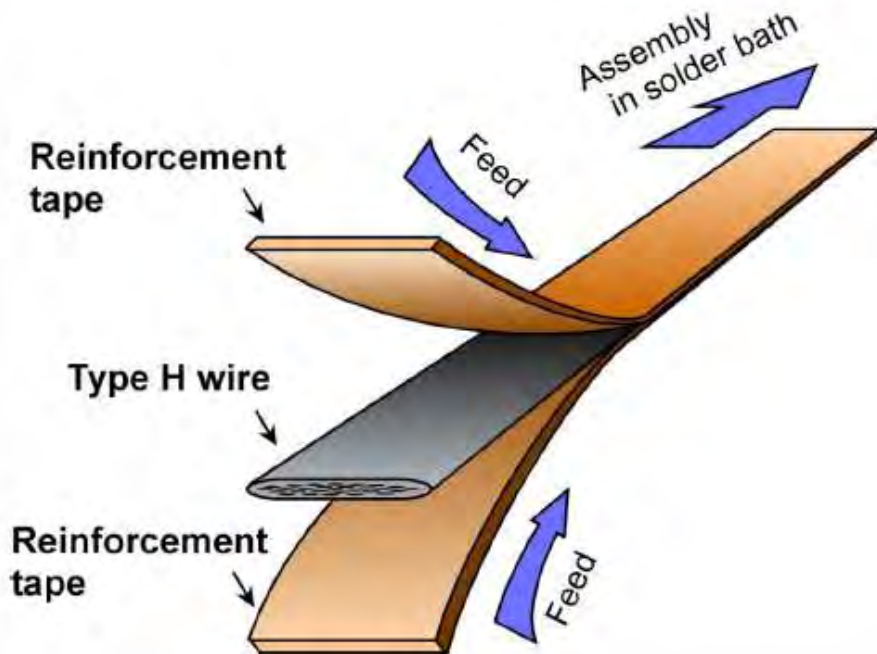
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DI-BSCCO Type HT



Bare wire (Type H)



Type HT (laminated wire)



- Type HT-NX with Ni-alloy
- Type HT-SS with Stainless steel
- Type HT-CA with Cu-alloy

- ✓ Type HT is laminated with reinforcement tapes
- ✓ These tapes are firmly bonded with Type H (insert) **by soldering**

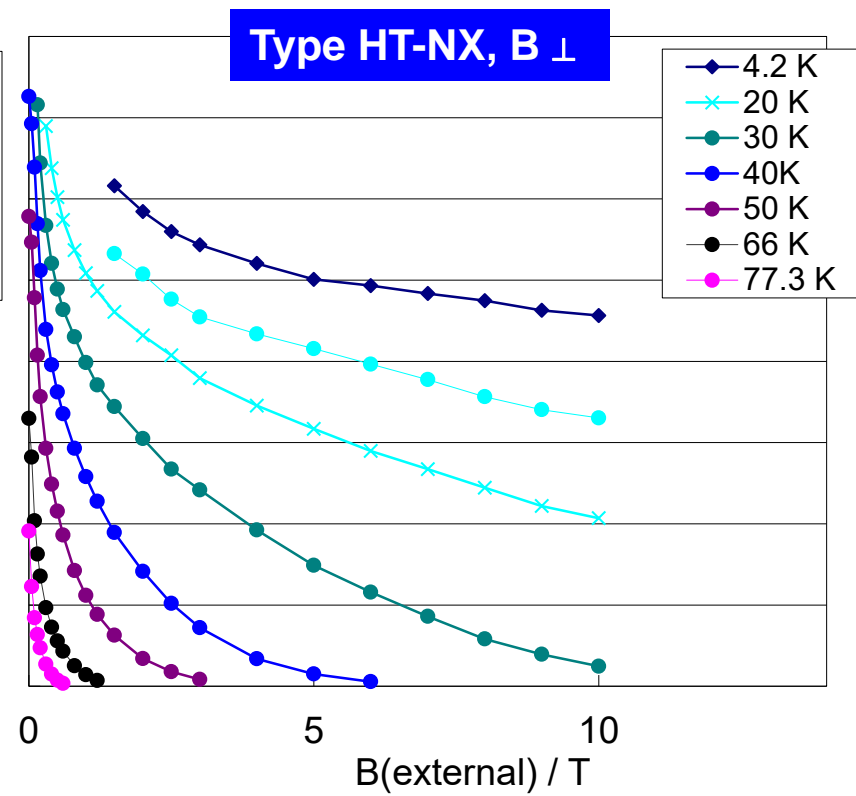
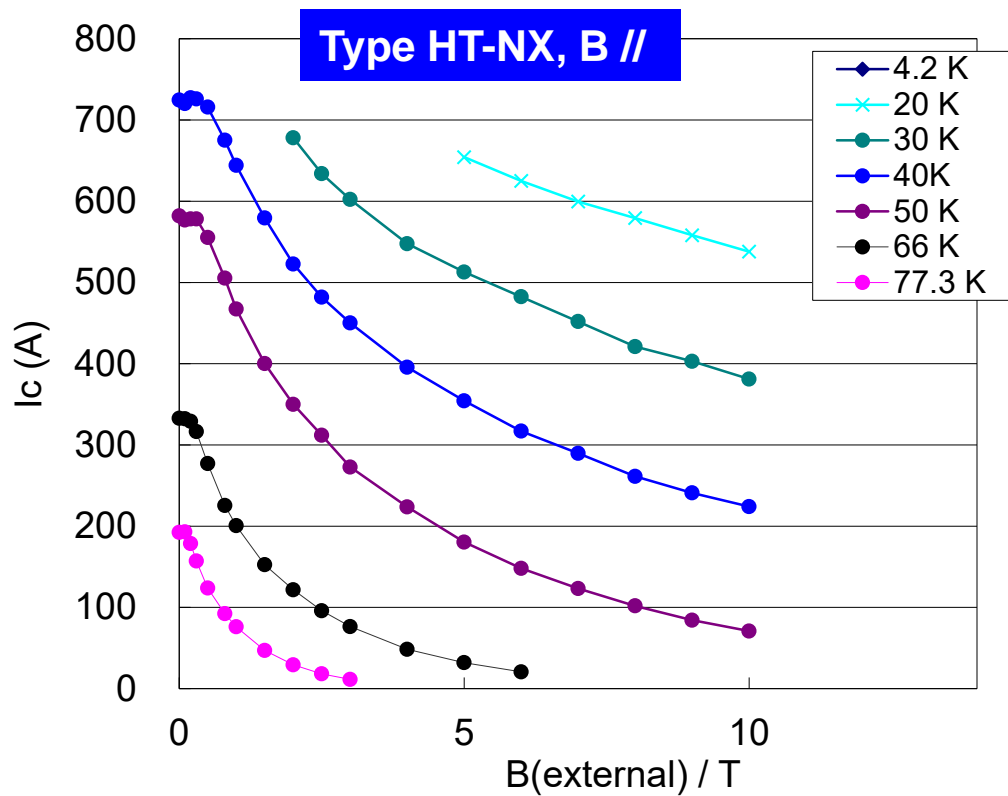
Topics: Performance @4.2K

- High field I_c
- Hoop stress test
- Double bend test

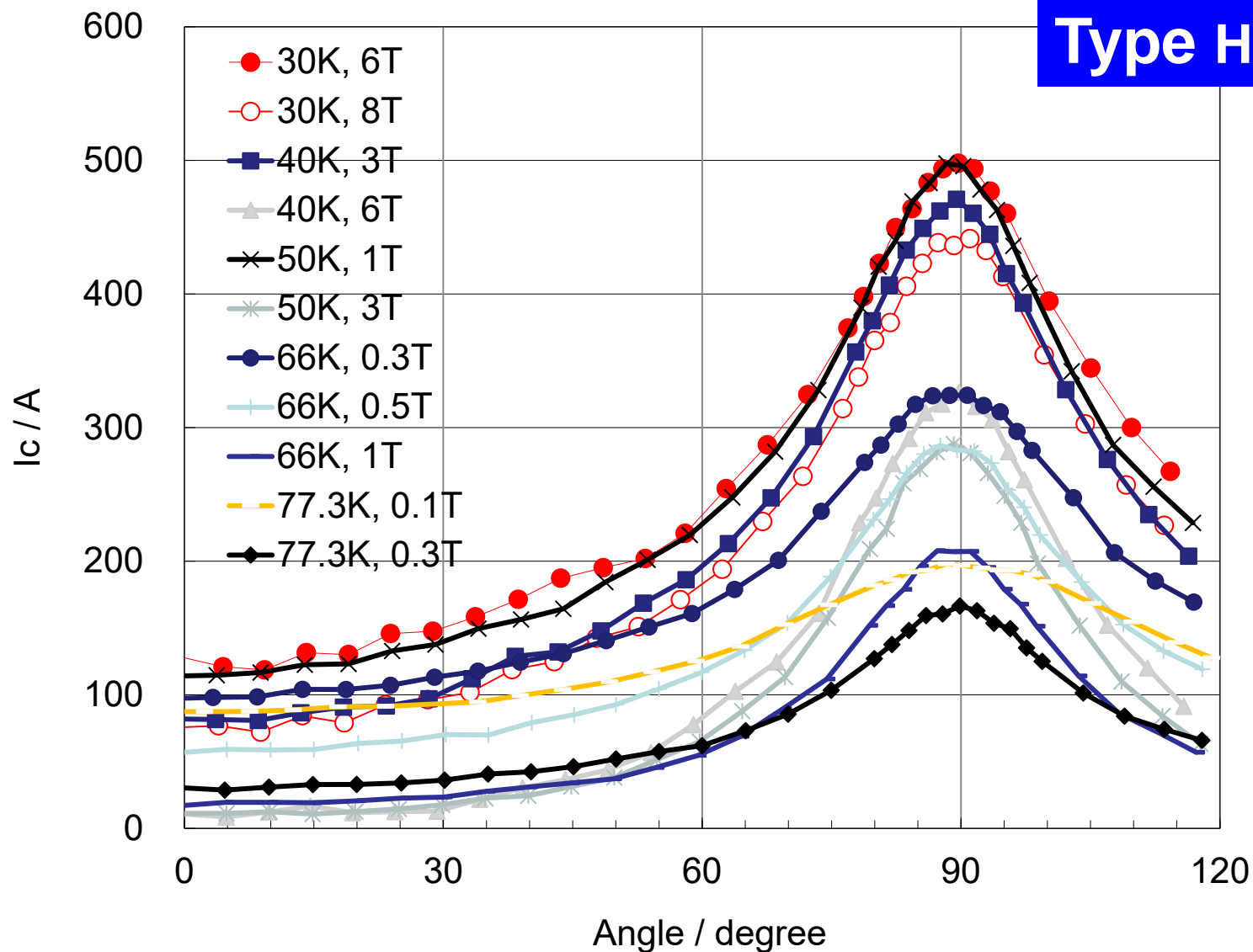
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I_c -B-T



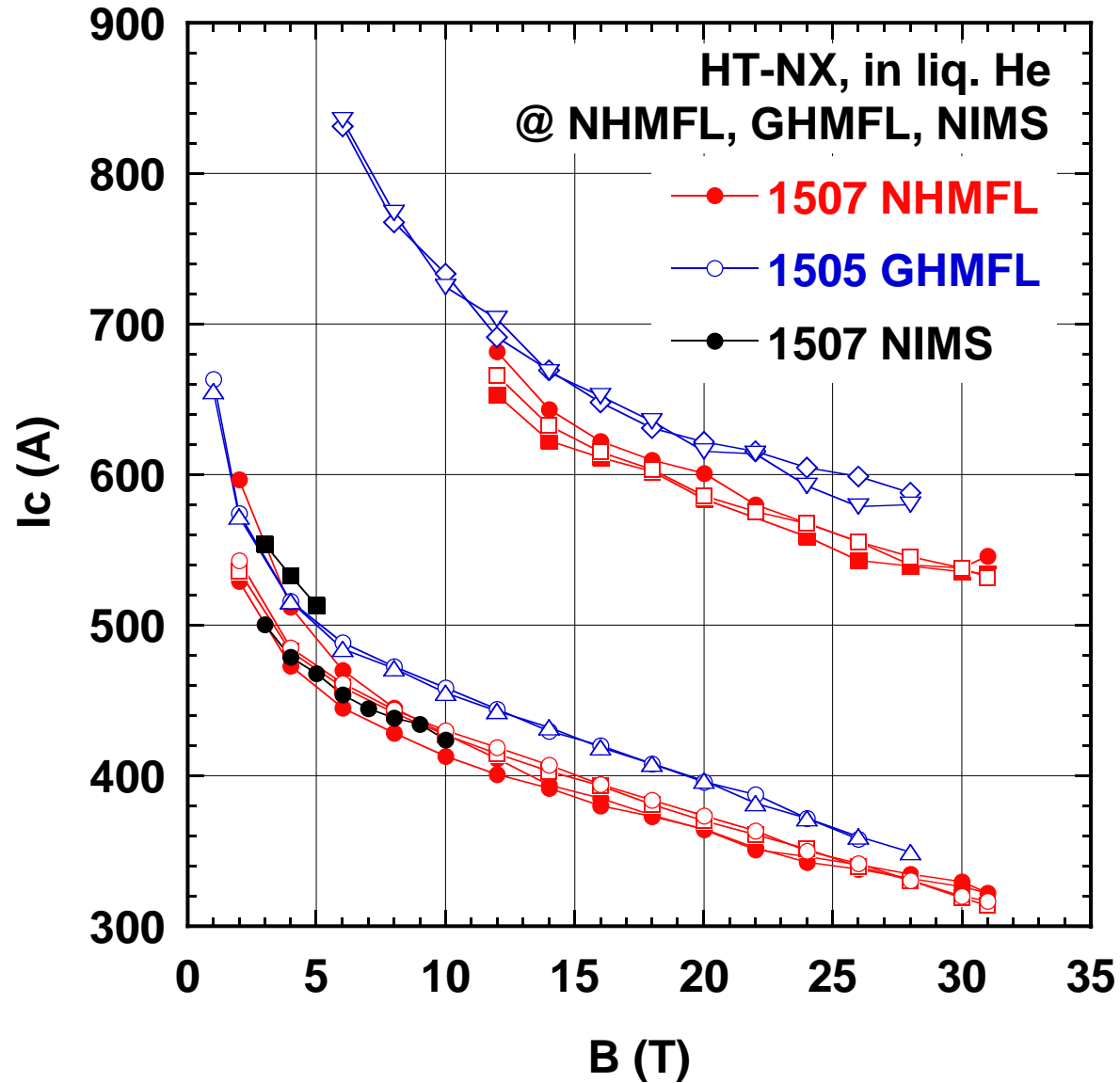
$I_c - B(\theta) - T$



(Measured by NIMS @RRI/NZ)

H.Kitaguchi/NIMS, @MEM16, 22/March/2016

I_c -B @4.2K



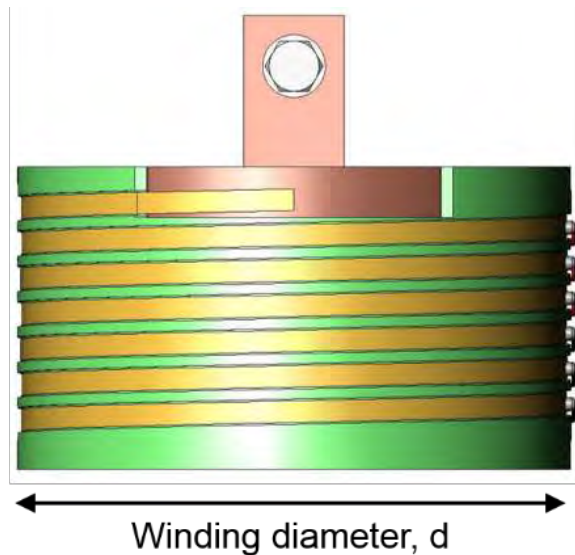
(Measured by NIMS @Grenoble, NHMFL & NIMS)

H.Kitaguchi/NIMS, @MEM16, 22/March/2016

Topics: Performance @4.2K

- High field I_c
- **Hoop stress test**
- Double bend test

Hoop stress test: (1) procedure

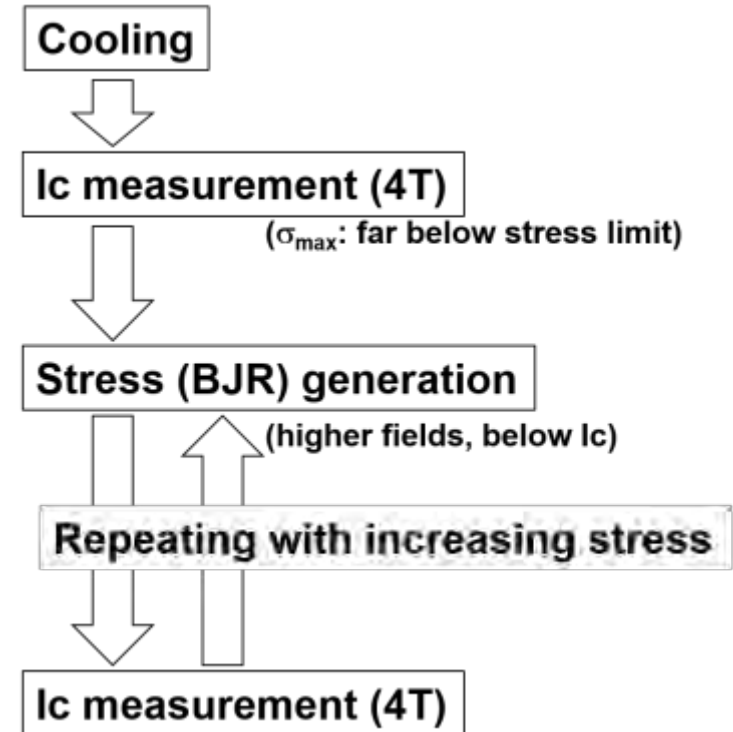


Using one layer coil specimen,
all test procedure was performed in liq.He bath.

O.D. = 108 mm

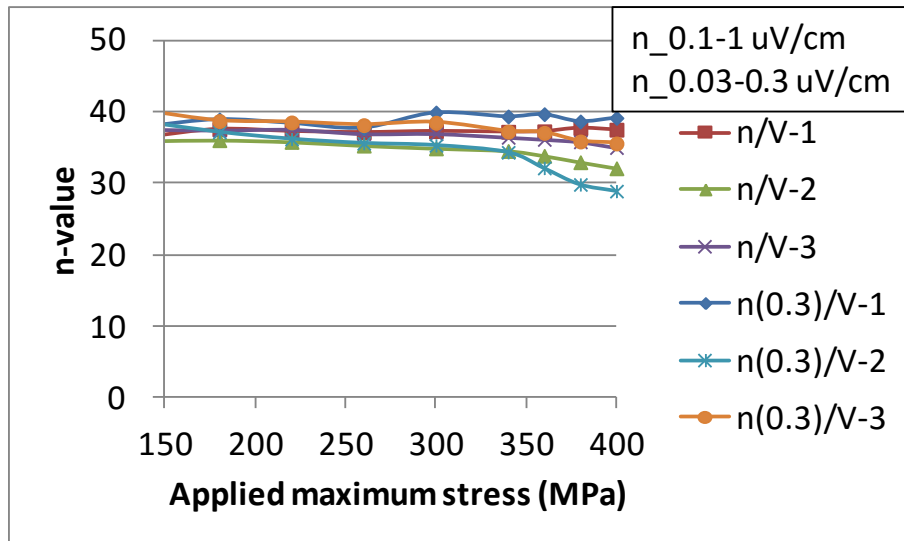
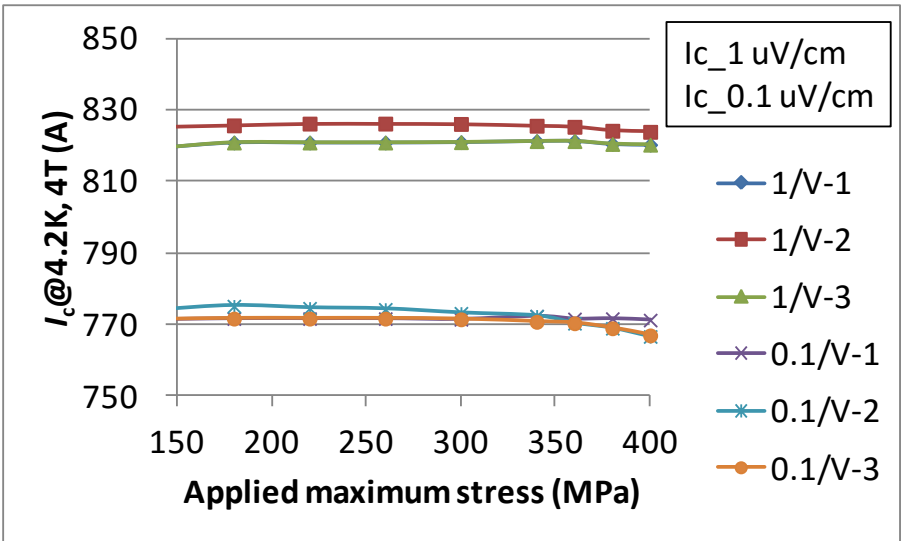
Wire length = 2 m

Voltage tap spacing (mm) = 340@V-1, 1021@V-2, 1701@V-3



Ref: Miyoshi et al., *Supercond. Sci. Technol.* **27** (2014) 025003

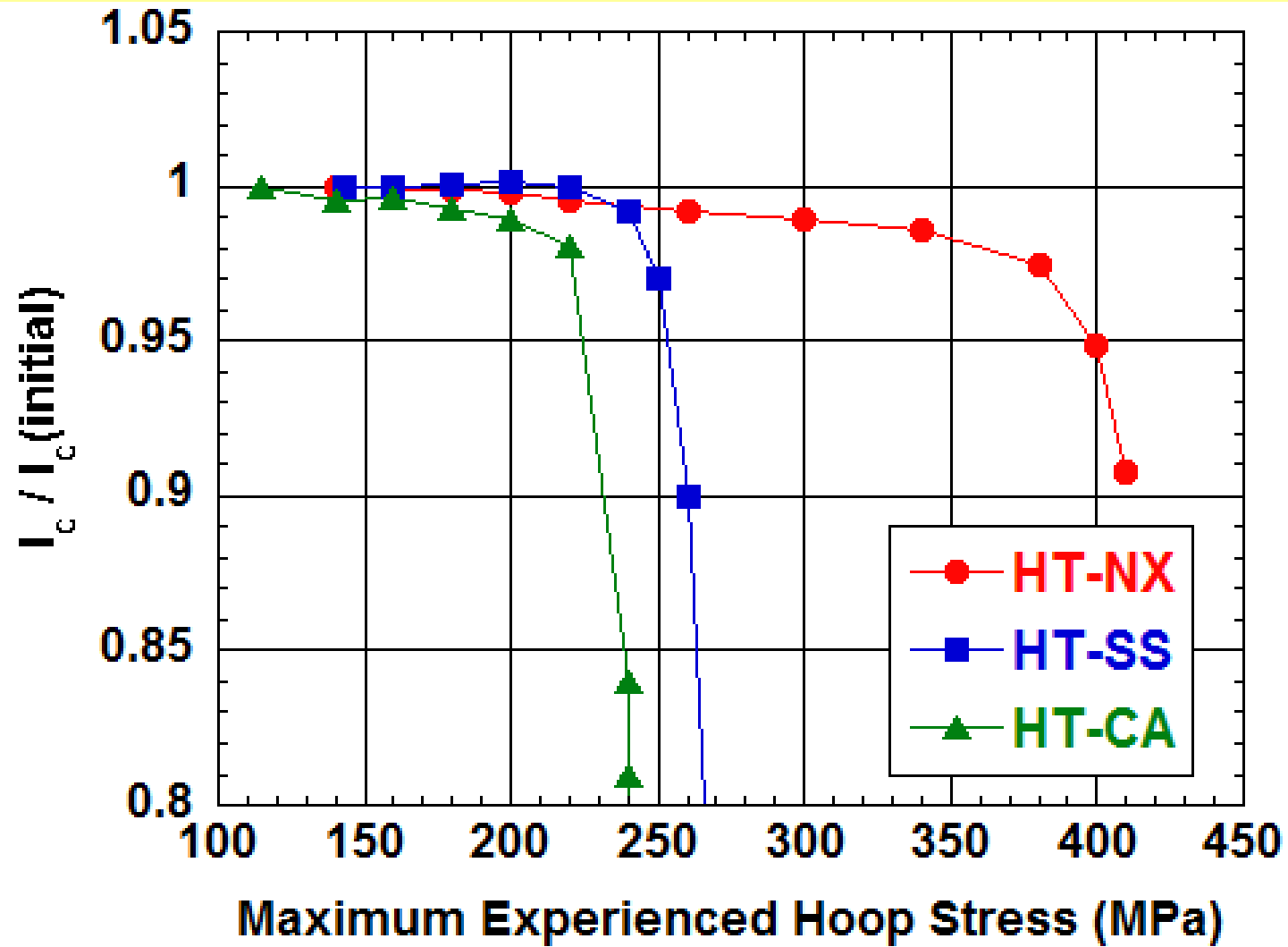
Hoop stress test: (2) I_c and n-value



(Measured by NIMS @Grenoble)



Hoop stress test: (3) comparison



(Measured by NIMS @Grenoble)

Ref: Miyoshi et al., *Supercond. Sci. Technol.* **27** (2014) 025003



Topics: Performance @4.2K

- High field I_c
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- **Double bend test**

Double bend test: (1) procedure

I_c measurement in liq. N, s.f.



Double bending @RT

bend. dia.:
70, 60, 50, 40, 38, 36, 34, 32 (mm)

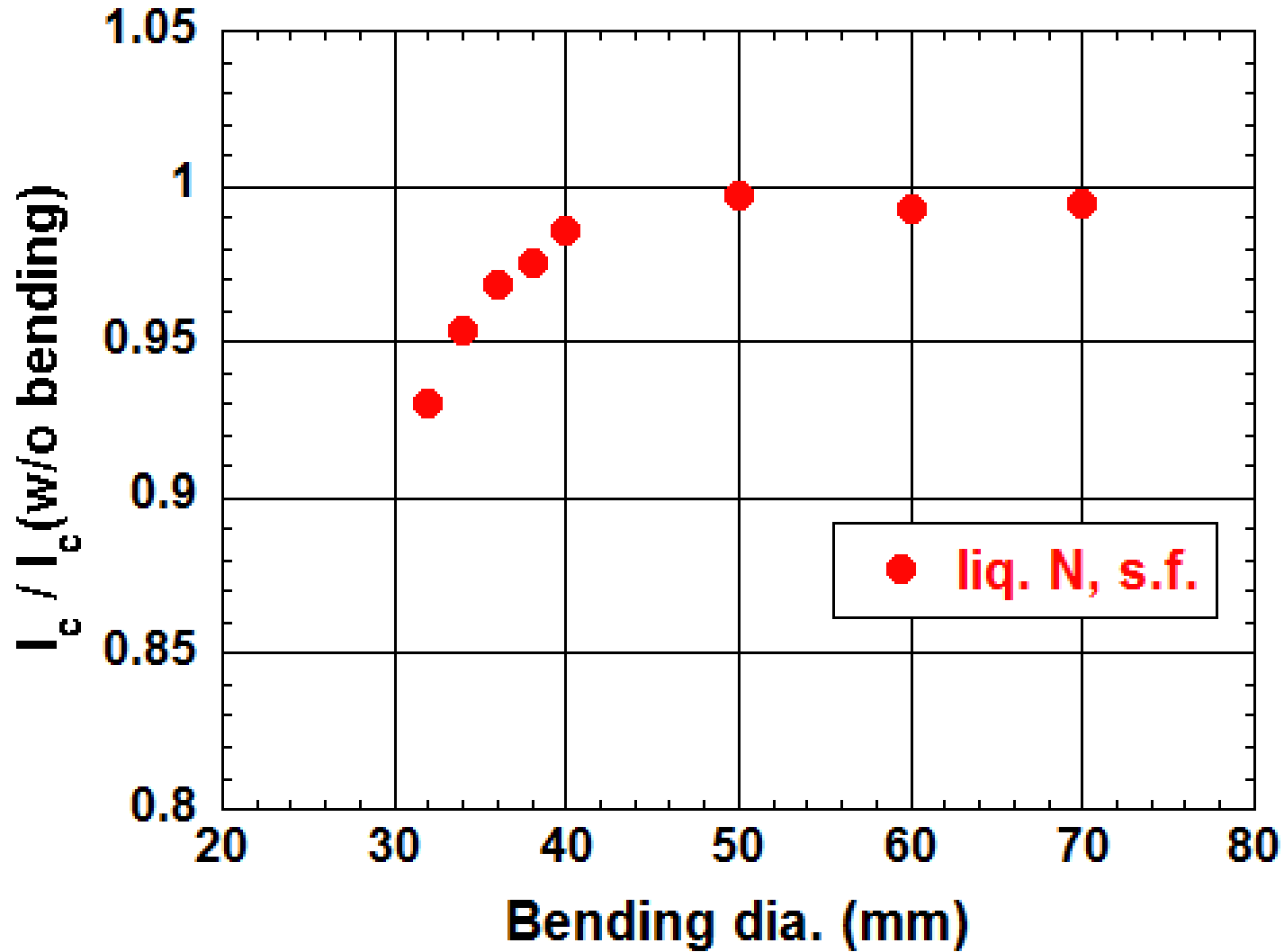


I_c measurement in liq. N, s.f.

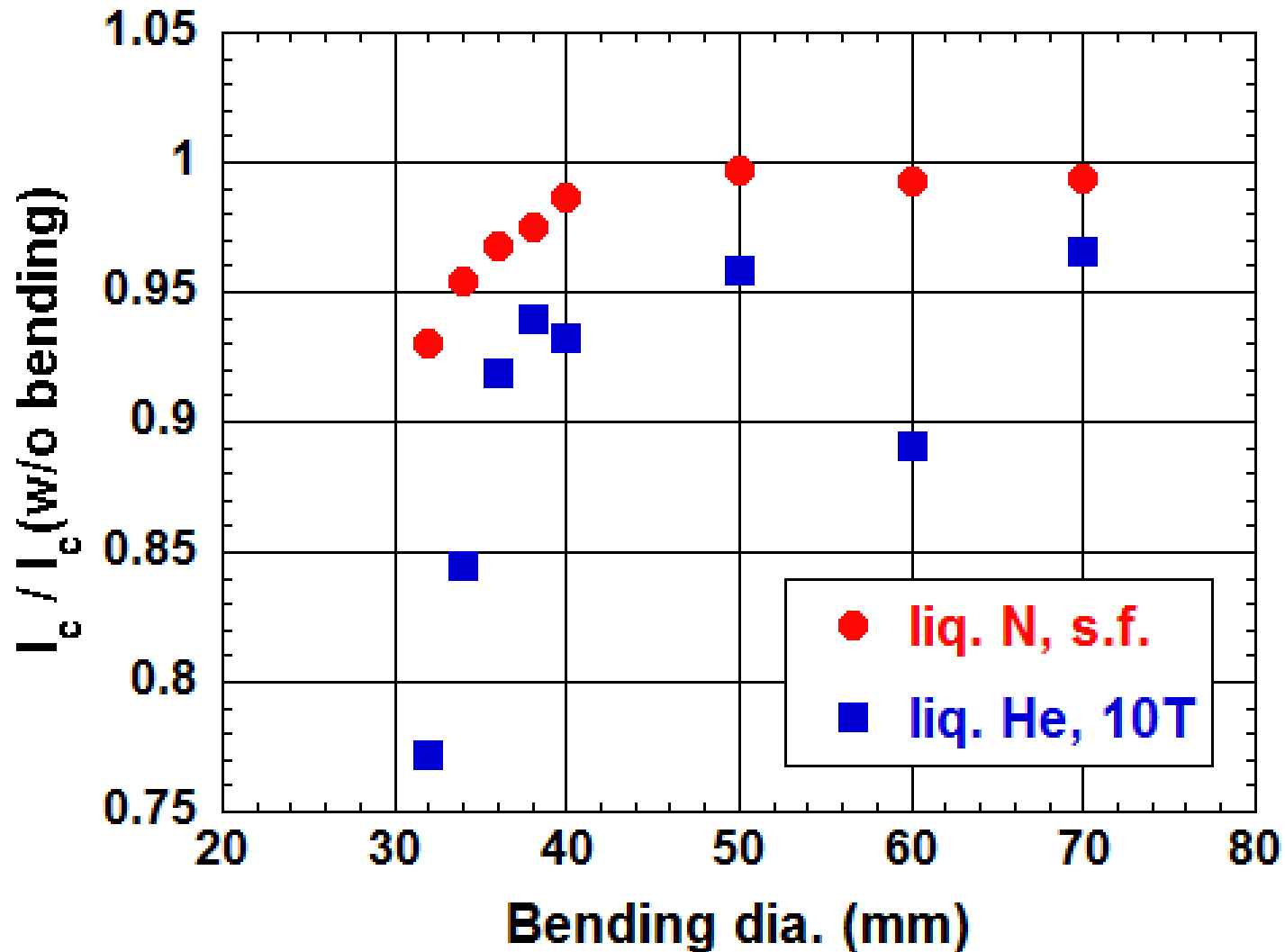


I_c measurement in liq. He, external field

Double bend test: (2) liq. N, s.f.



Double bend test: (3) liq. He, 10T(perp.)



Remarks: Bi-2223 HT-NX @4.2K

- High field I_c

B // tape surface: >500A @31T

B \perp tape surface: >400A @12T

- Hoop stress test

**Good homogeneity
400 MPa**

- Double bend test

95% I_c retention @77K: be careful