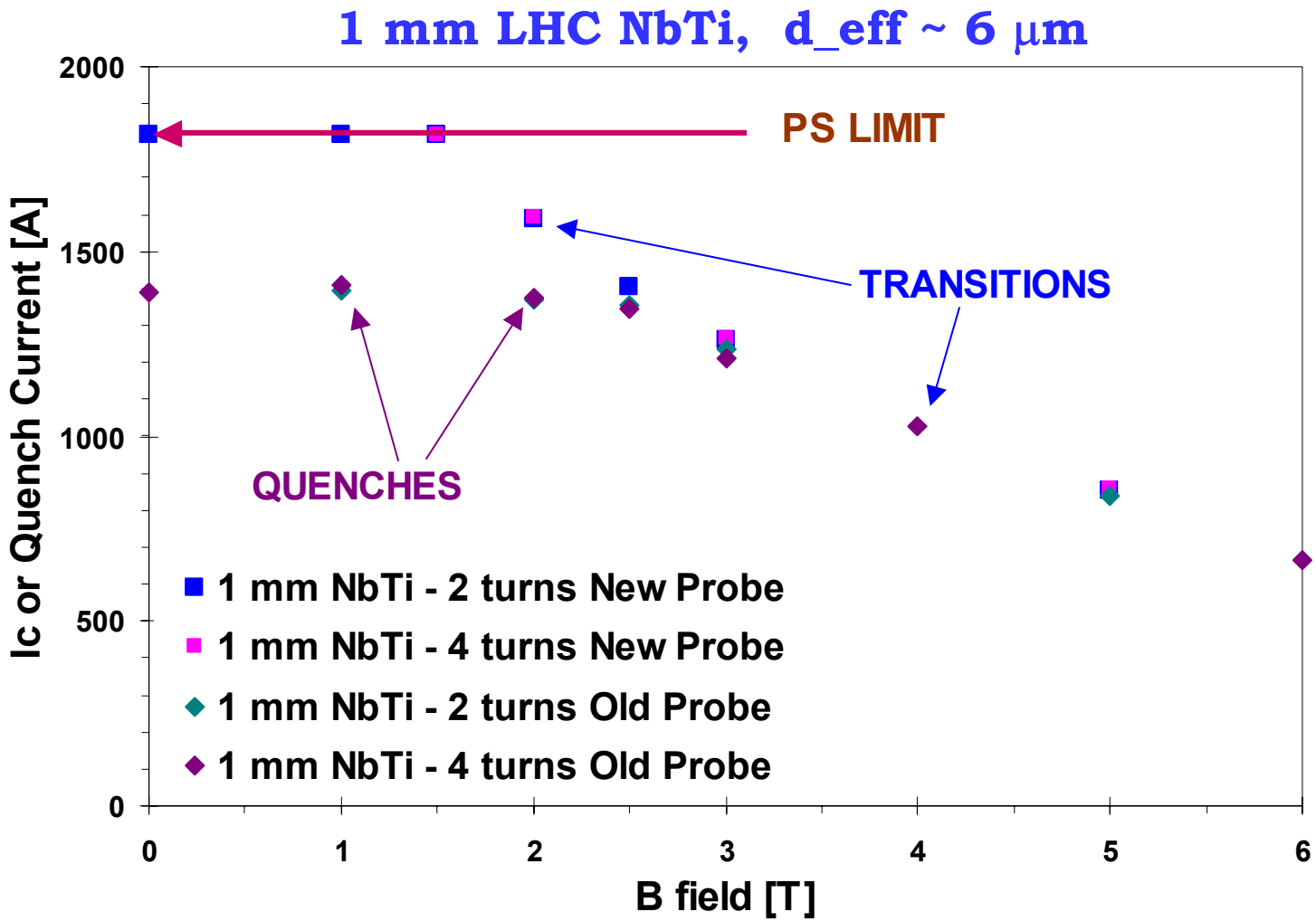
Instabilities in Transport Current Measurements of Nb_3Sn Strands

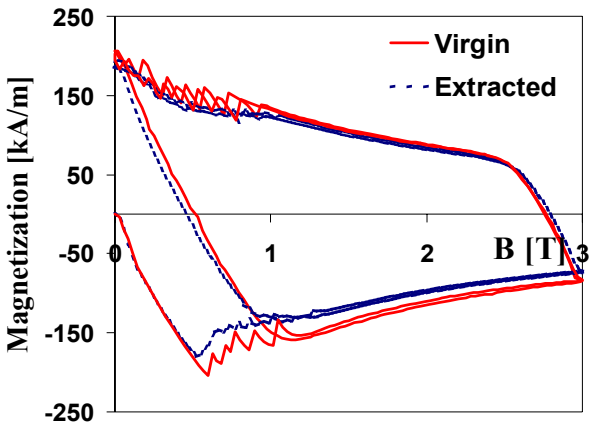
Emanuela Barzi

- **Strand data from high to low fields using new probe**

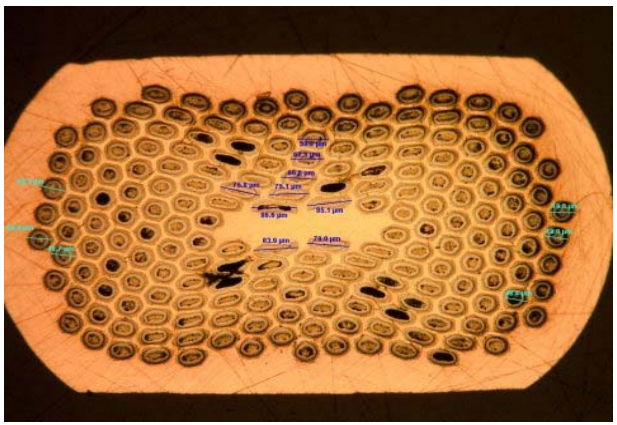
Measurements at Low Fields of Stable Strands



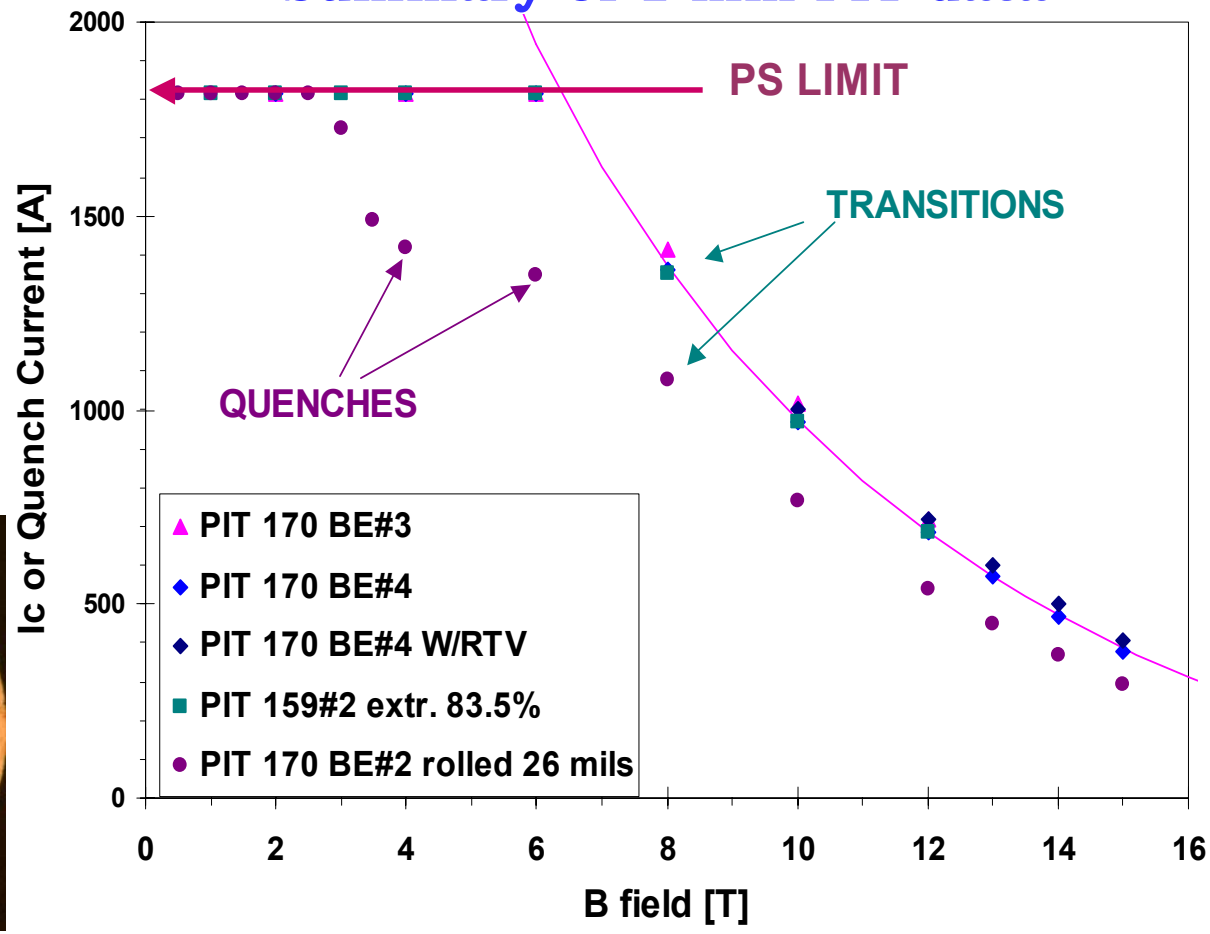
Instability Studies - 1



d_eff ~ 50 μm

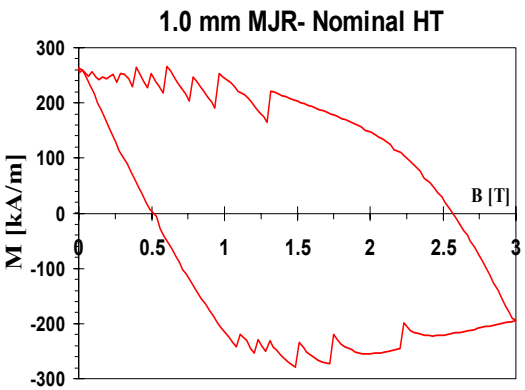


Summary of 1 mm PIT data

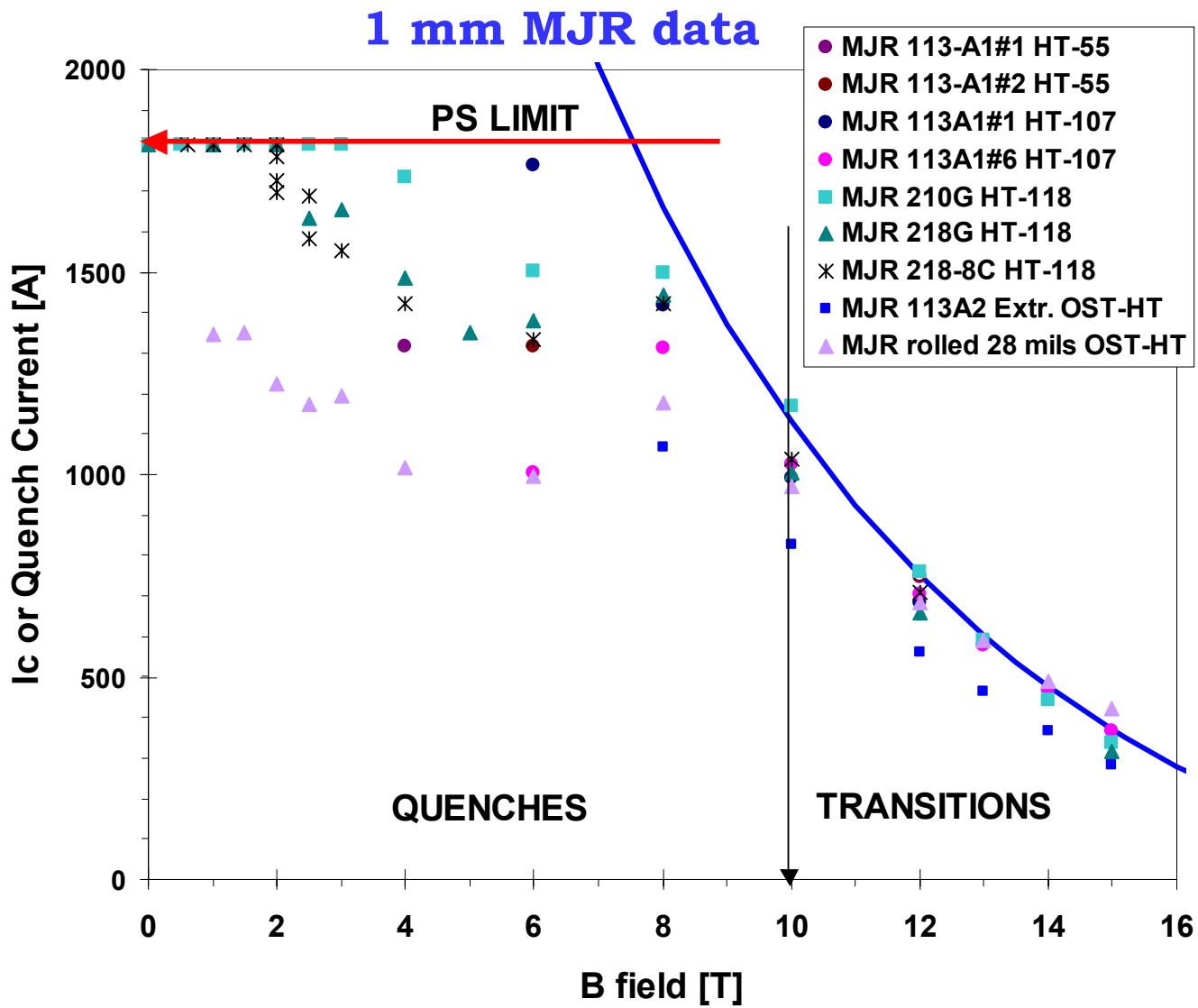


- Shows measurements quality for stable samples
- Shows instability somewhere below 8 T for rolled sample, where filament elongation can be estimated at ~30% (i.e. d_eff~60-80 μm)

Instability Studies - 2

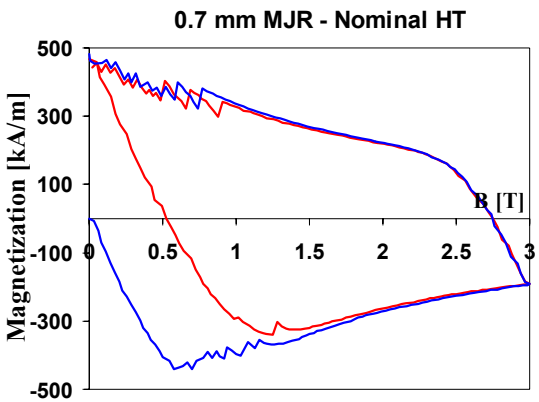


d_eff ~ 110 μm



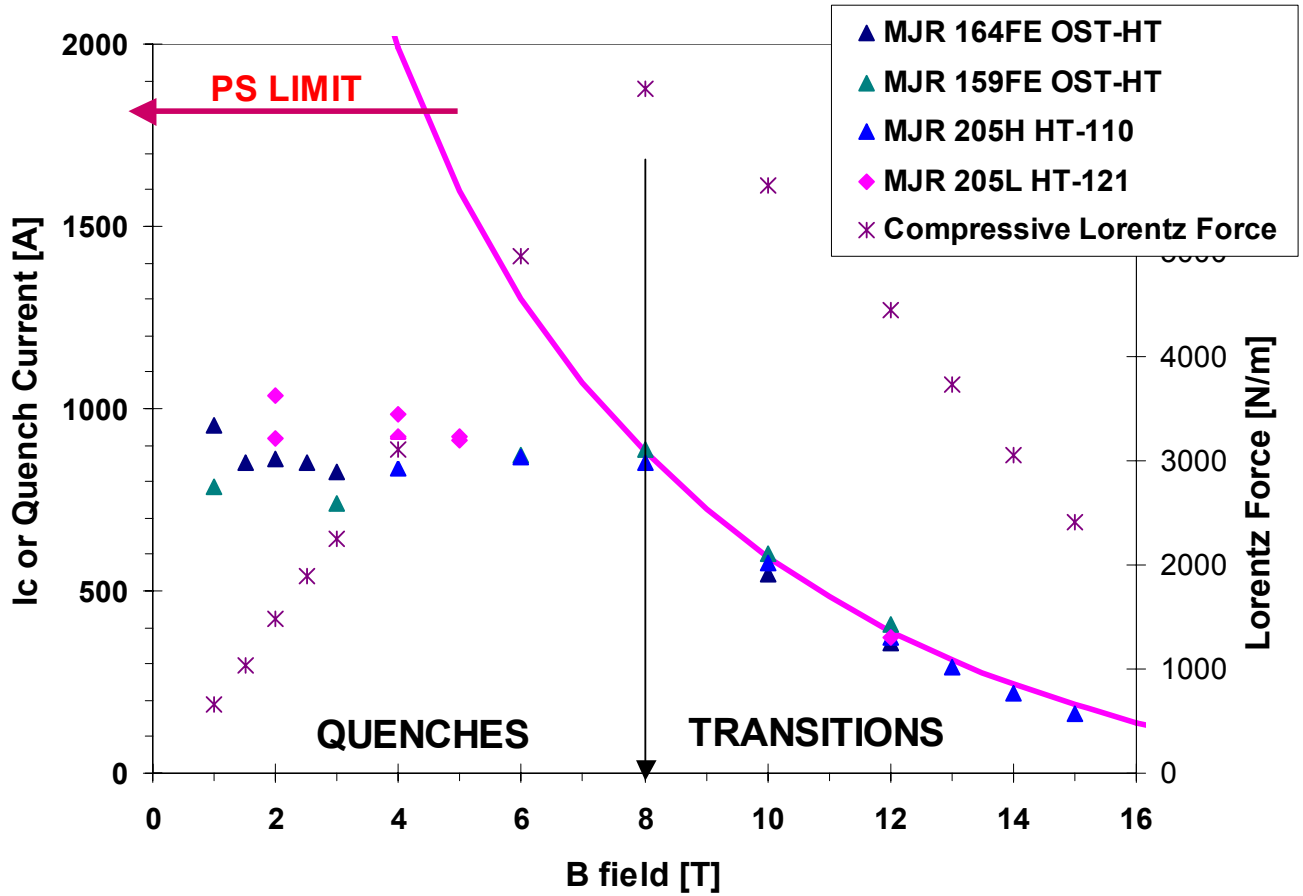
- **Shows obvious instabilities at about and below 10 T**

Instability Studies - 3



d_eff ~ 78 μm

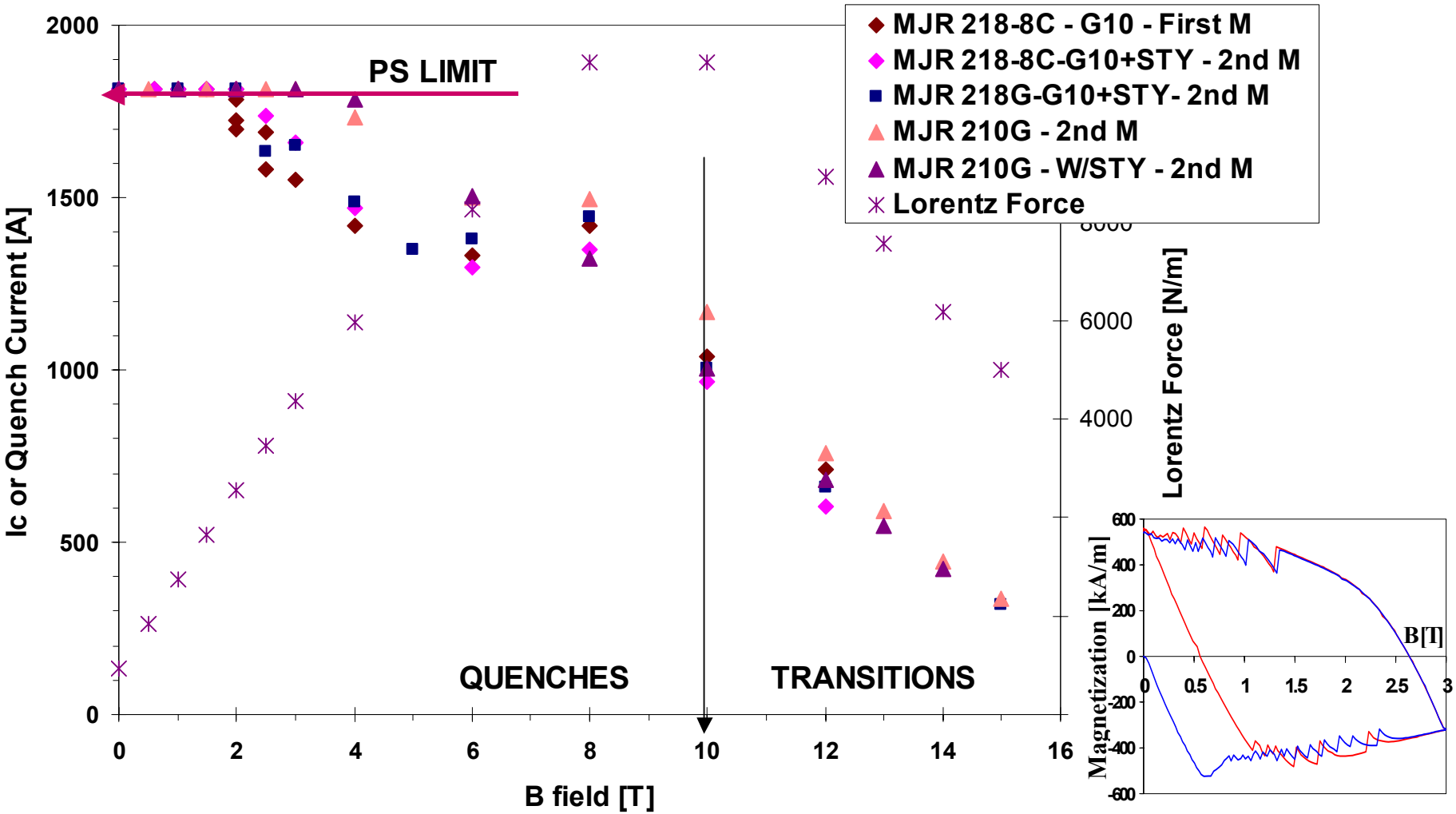
0.7 mm MJR data



- **Shows obvious instabilities at about and below 8 T**

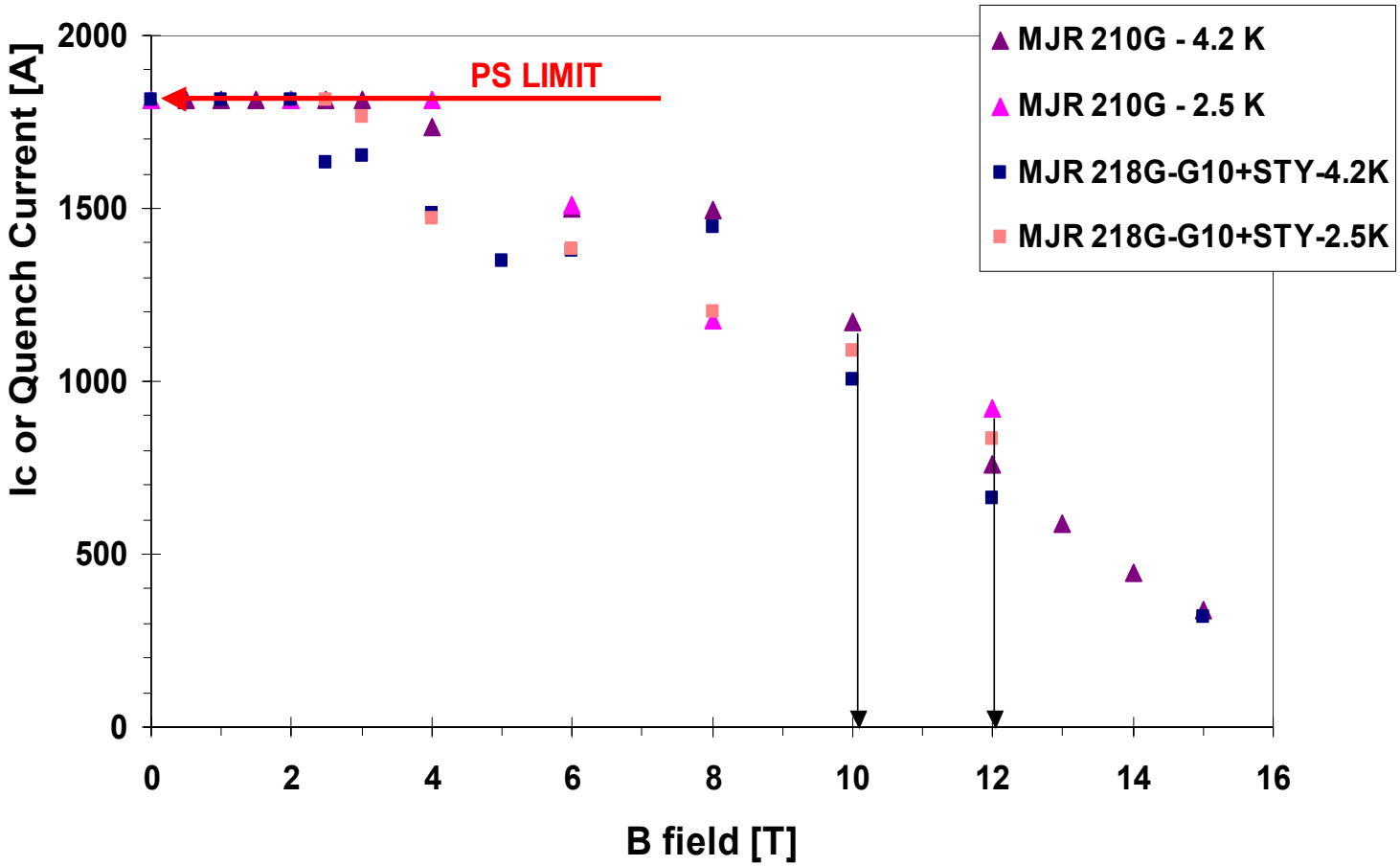
Instability Studies - 4

- What about mechanical stability?
- Is there an effect of first vs. second magnetization?

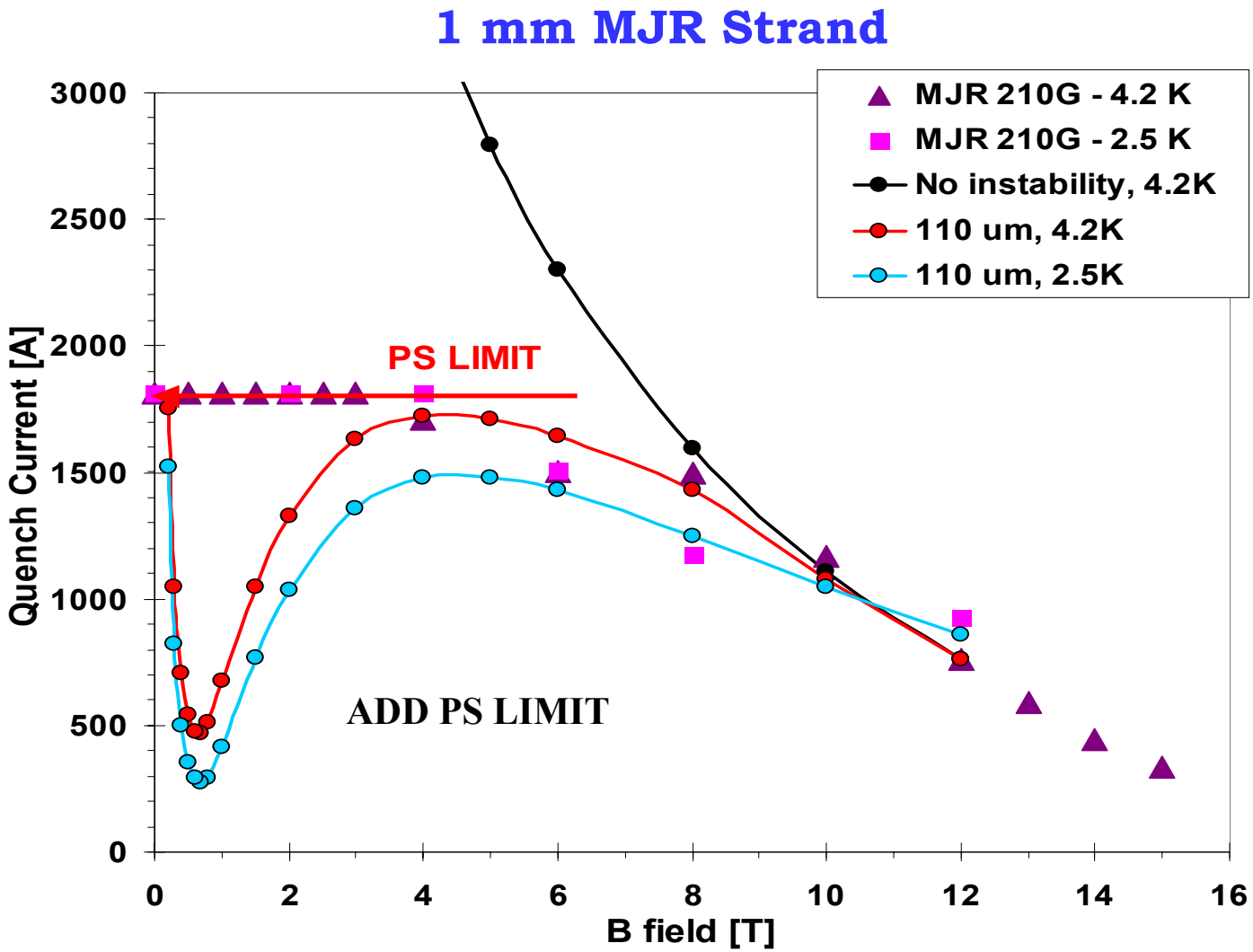


Instability Studies - 5

❖ **We see a weak dependence of instabilities on temperature**

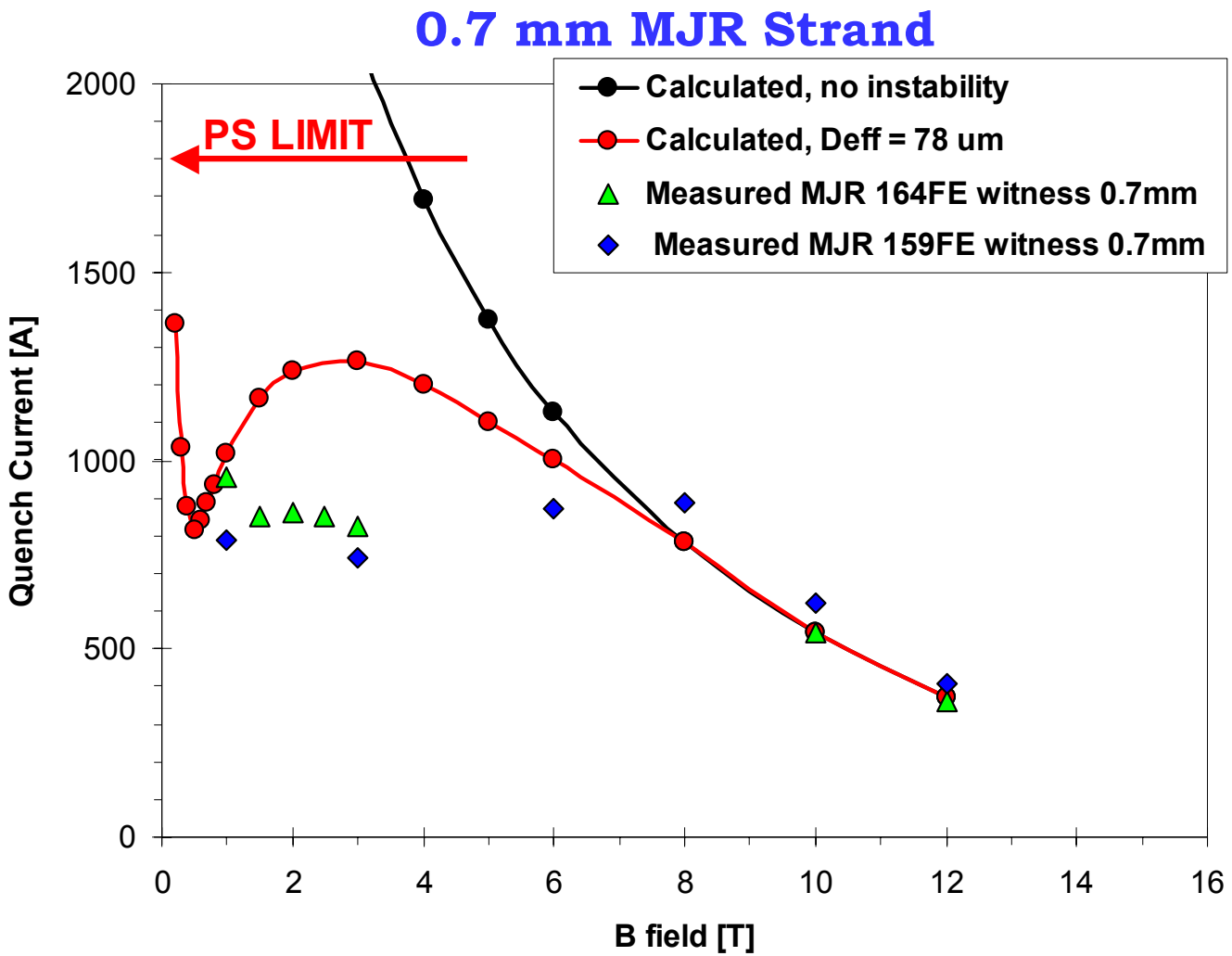


Flux Jumps Model – Comparison with Data - 1



Vadim Kashikhin

Flux Jumps Model – Comparison with Data - 2



- Basic model, needs more theoretical work
- Help from outside is welcome

Summary

- **Work on strand stability:**
  - **Quench currents at high and low fields**
  - **Magnetization at high and low fields**
  - **Analysis & Modeling**

- **FOR INDUSTRY:**
  - **Relevance of d_eff in strand performance requires R&D efforts in that direction**