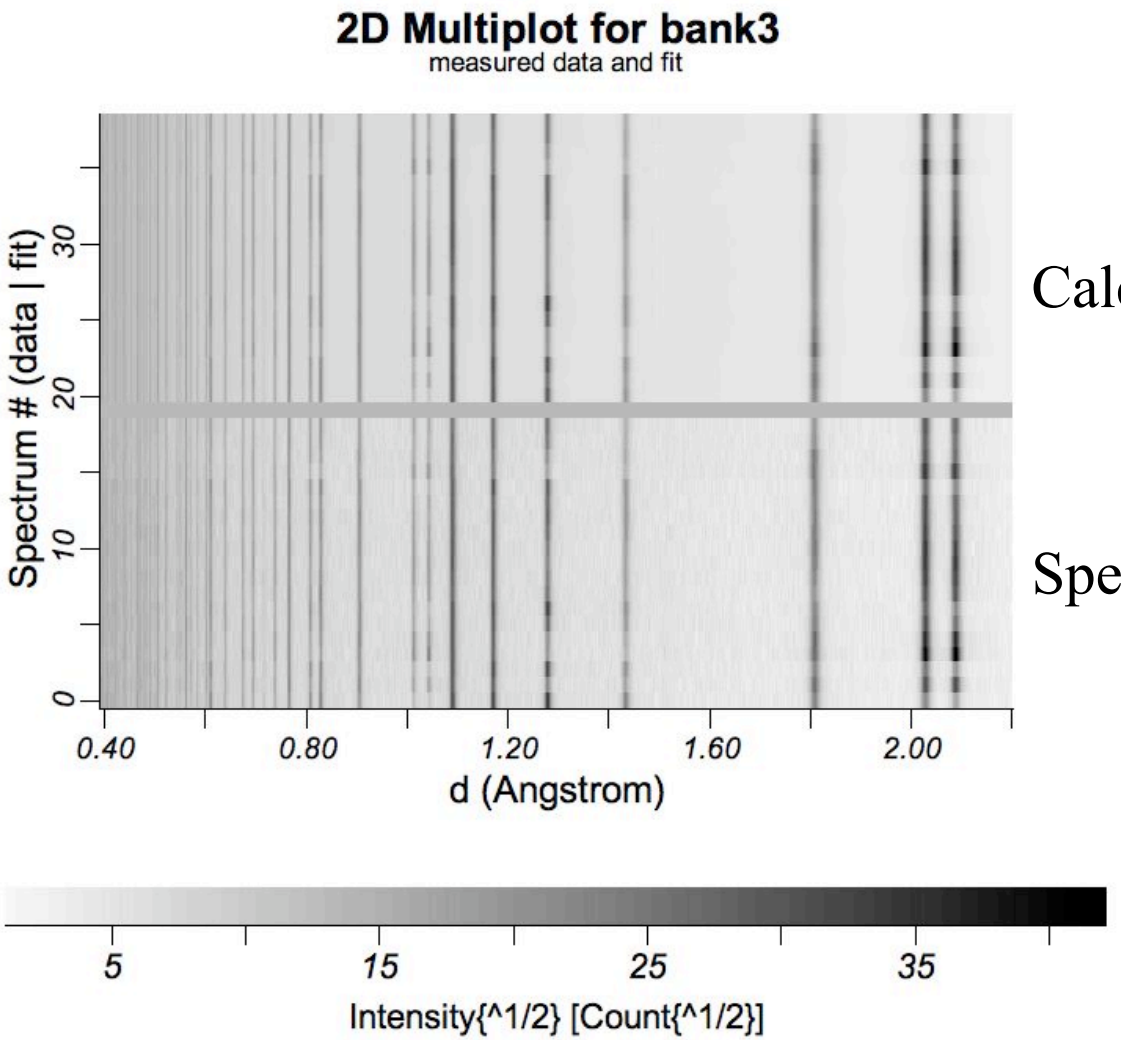
Analysis of rolled Cu67-Fe33 samples

- Production: Powder metallurgy (Technical University of Hamburg-Harburg, B. Commentz)
- Cold Isostatic Pressing (115 Mpa)
- Hot Pressing (750°C, 50 Mpa, 30 min)
- Resulting compacts: 1% porosity
- Rolling at 5 m/min
  - I: not deformed
  - II: 6 pass for -0.1/pass, plastic deformation: -0.607
  - III: 6 pass for -0.2/pass, plastic deformation: -1.142
- Measurements by Neutron TOF at IPNS (US) to obtain texture and stresses

Spettri TOF (neutroni) e analisi

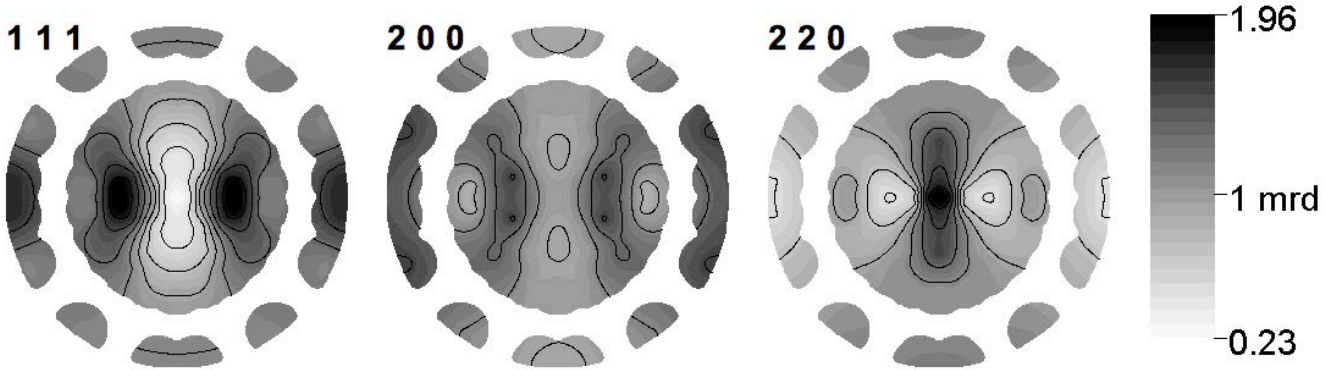


Calcolati

Sperimentali

Figure polari (Cu)

Sperimentali



Calcolate

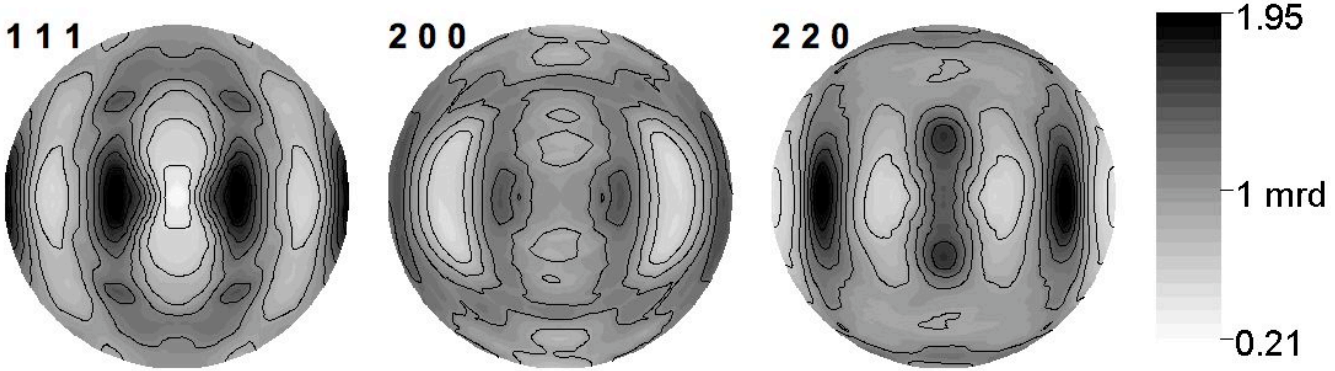
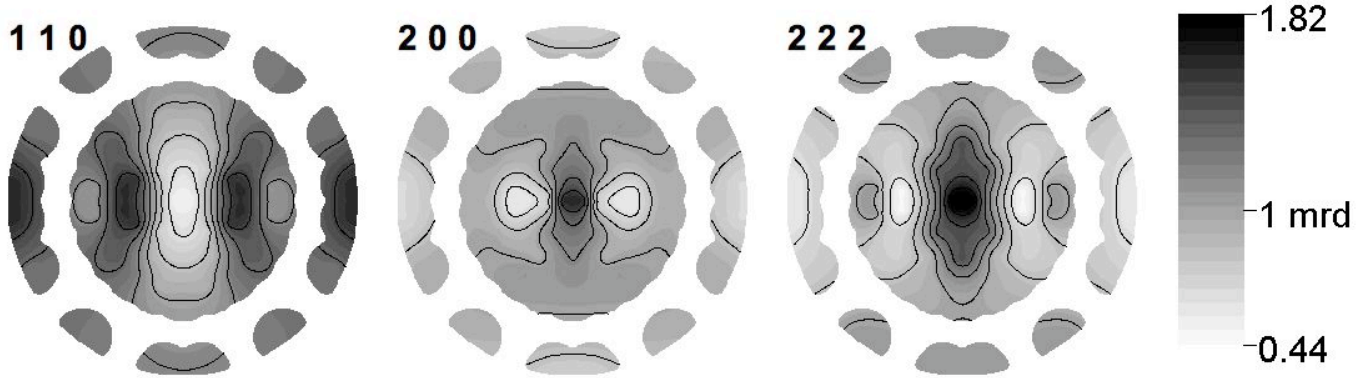
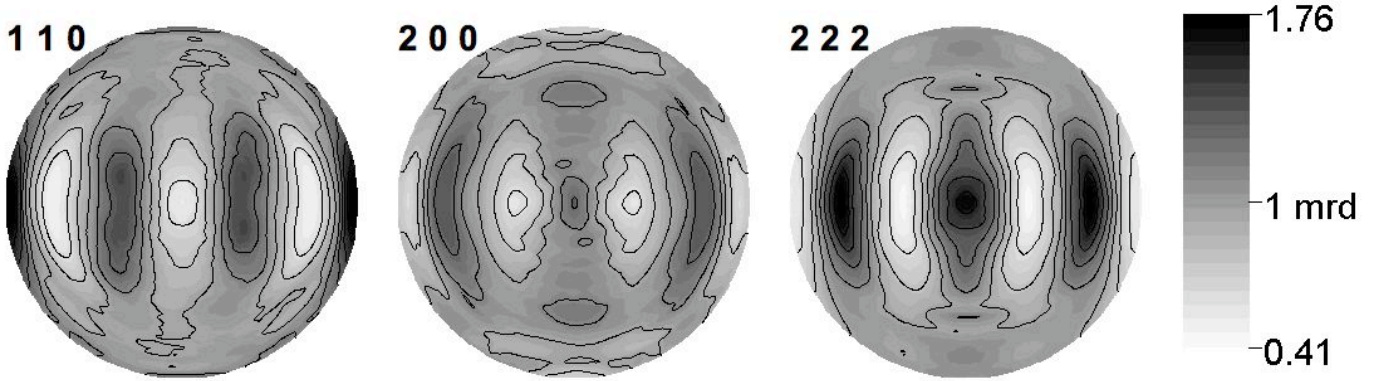


Figure polari Fe

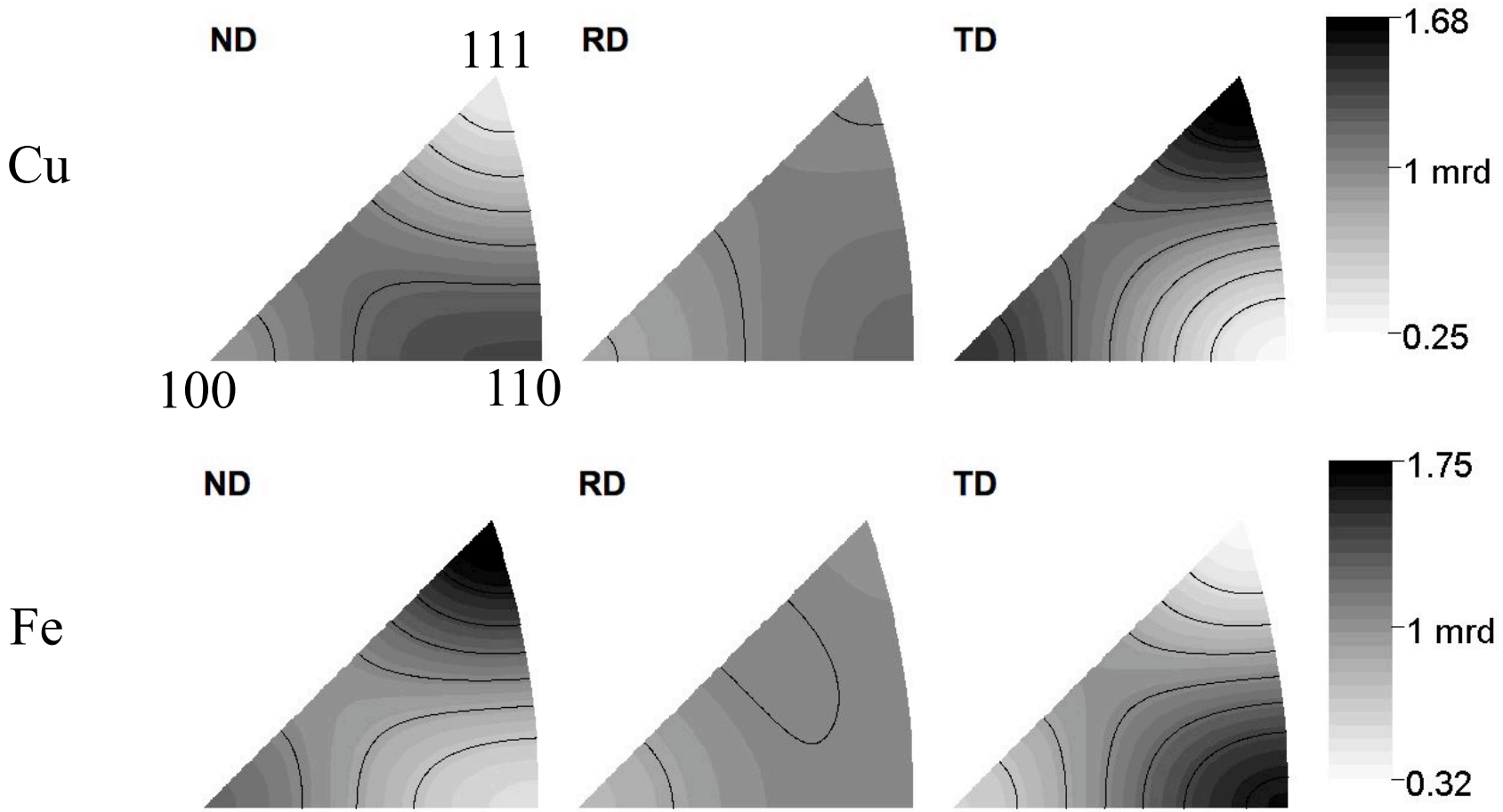
Sperimentali



Calcolate



Confronto Cu - Fe (figure polari inverse)



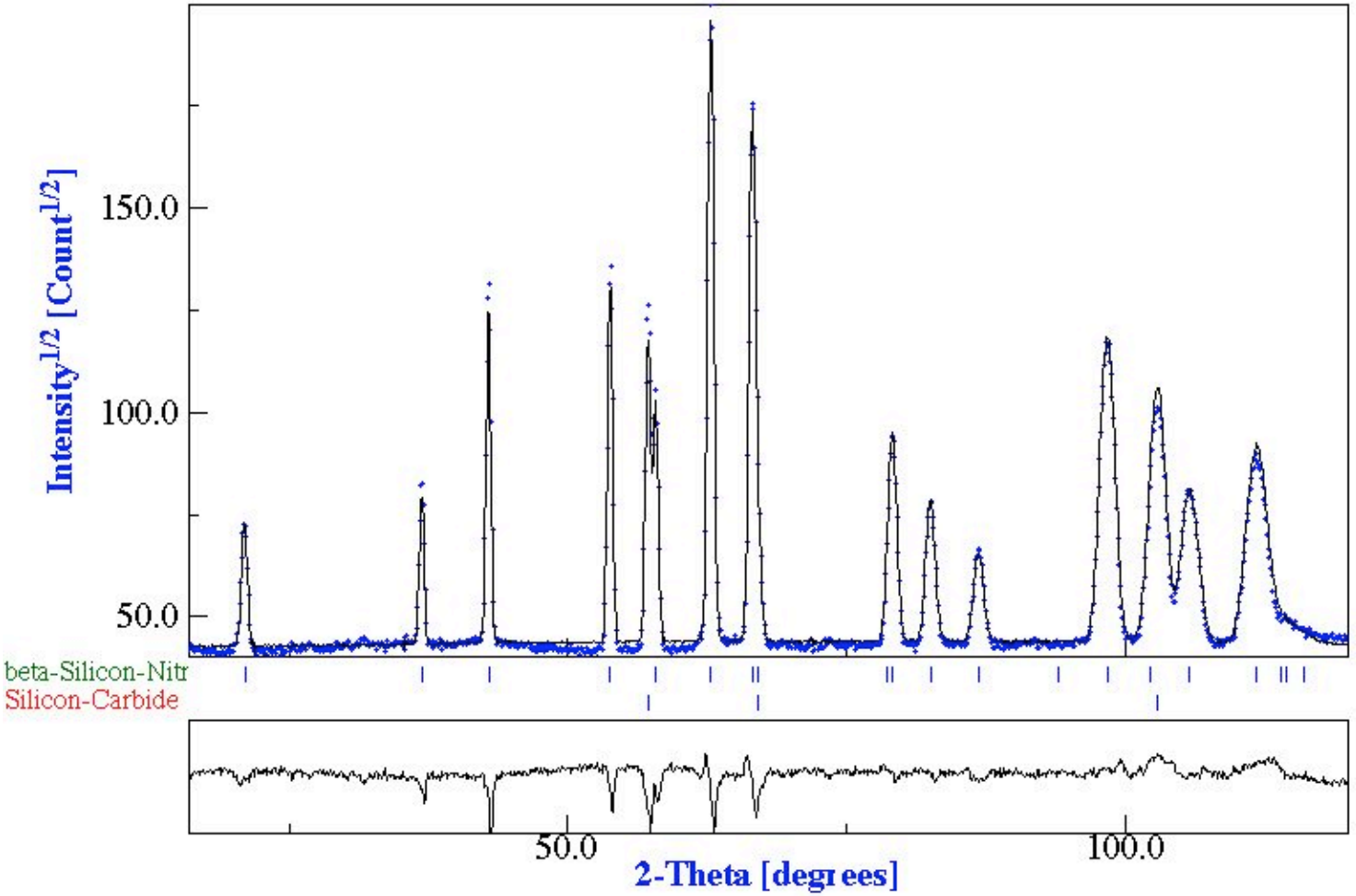
Analysis Results: QPA and stresses

- CuFeII:
  - Cu volume fraction: 68(1) %
  - σ_{Cu} = 27 MPa
- CuFeIII:
  - Cu volume fraction: 67(1) %
  - σ_{Cu} = 30 MPa

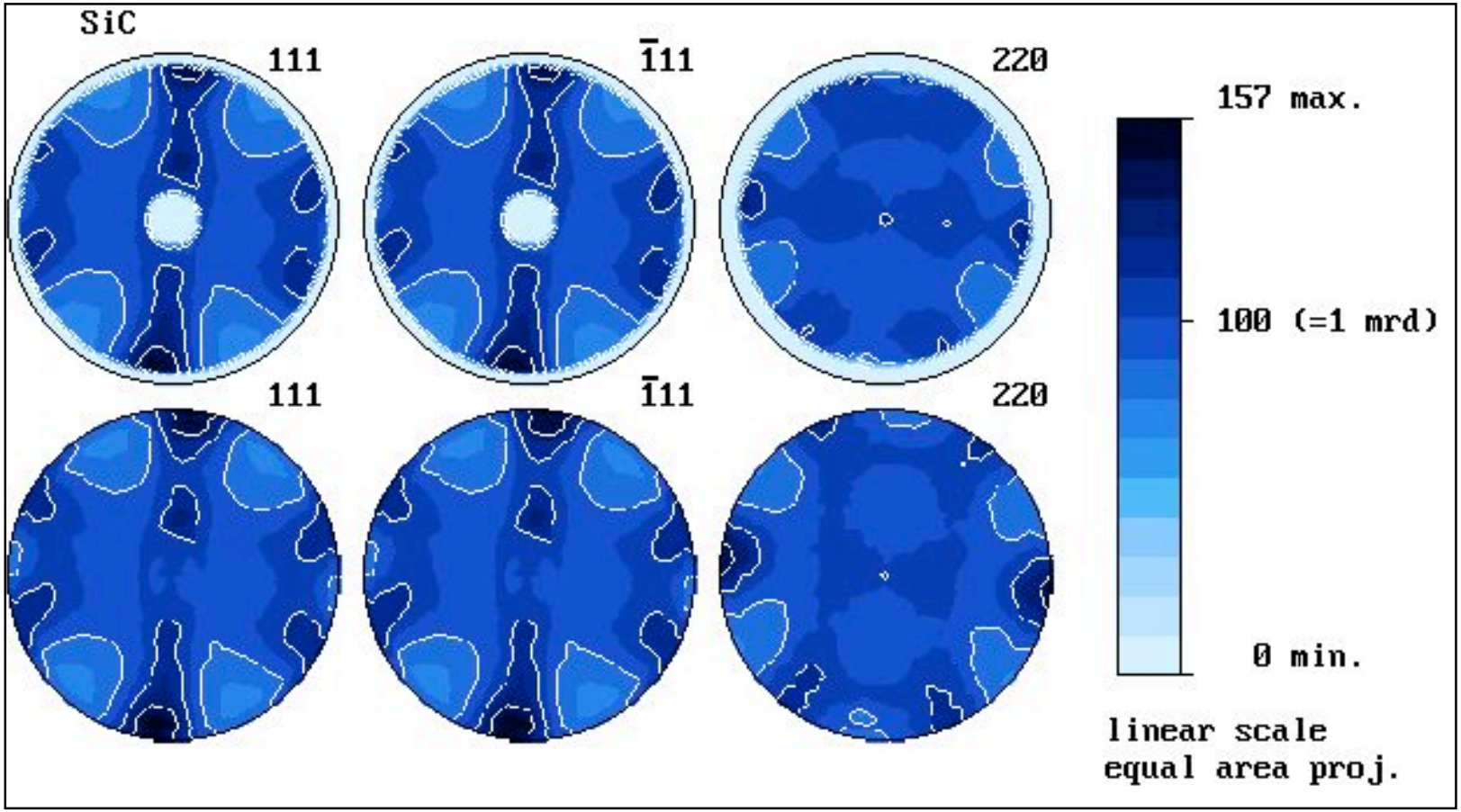
Kryptonite: SiC-Si_3N_4 composites

- SiC whiskers: (111) along fiber direction
- Matrix: β-Si_3N_4
- Minor glass quantity (for sintering aid)
- Composite obtained by HIP
- Diffraction measurements:
  - D20-ILL: neutron, PSD, Eulerian cradle
    - 720 spectra, 10°x10° grid on χ and ϕ, 2 ω positions
- Analyzed by Maud using RiTA (Rietveld Texture Analysis)

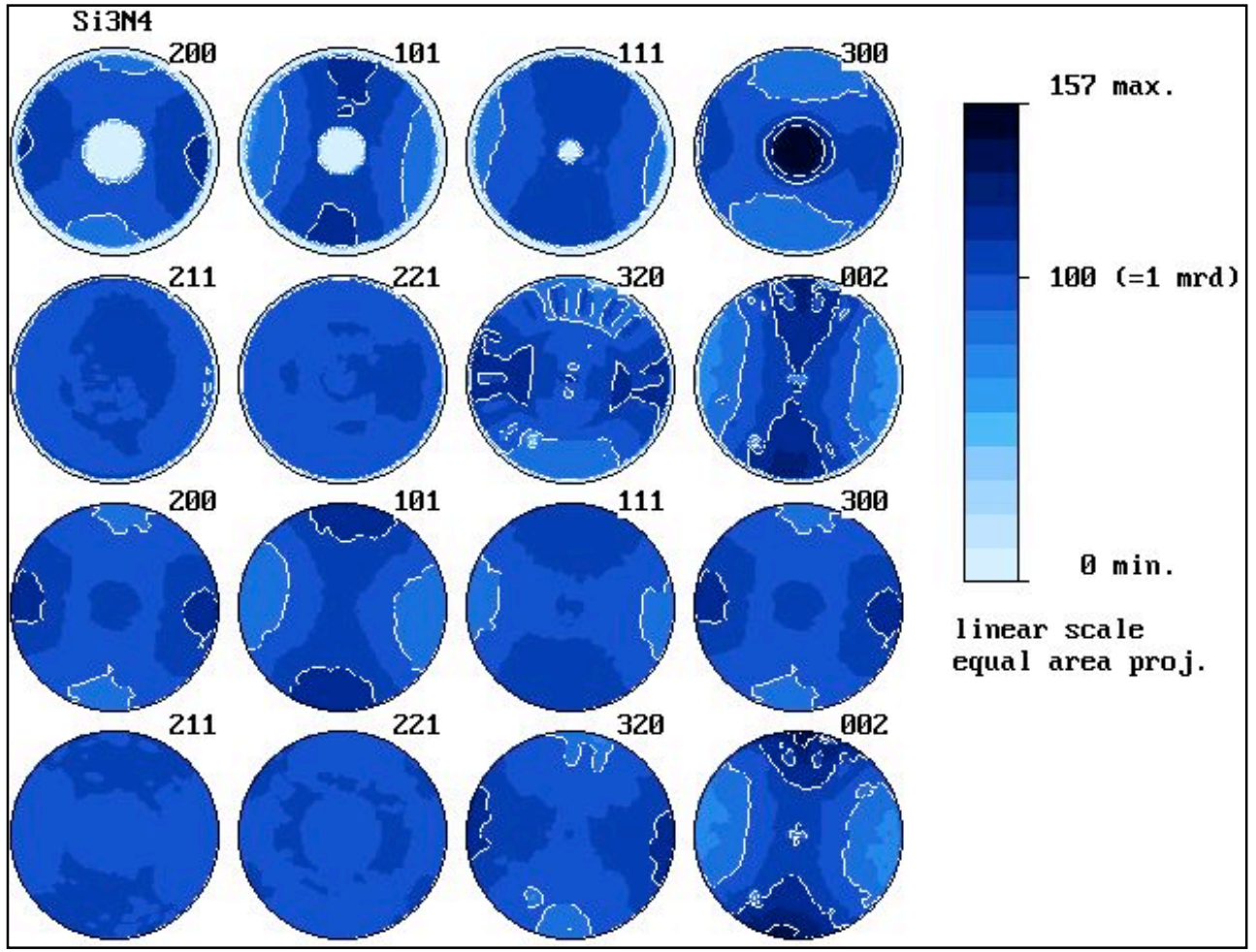
Kryptonite spectrum fitted (selected)



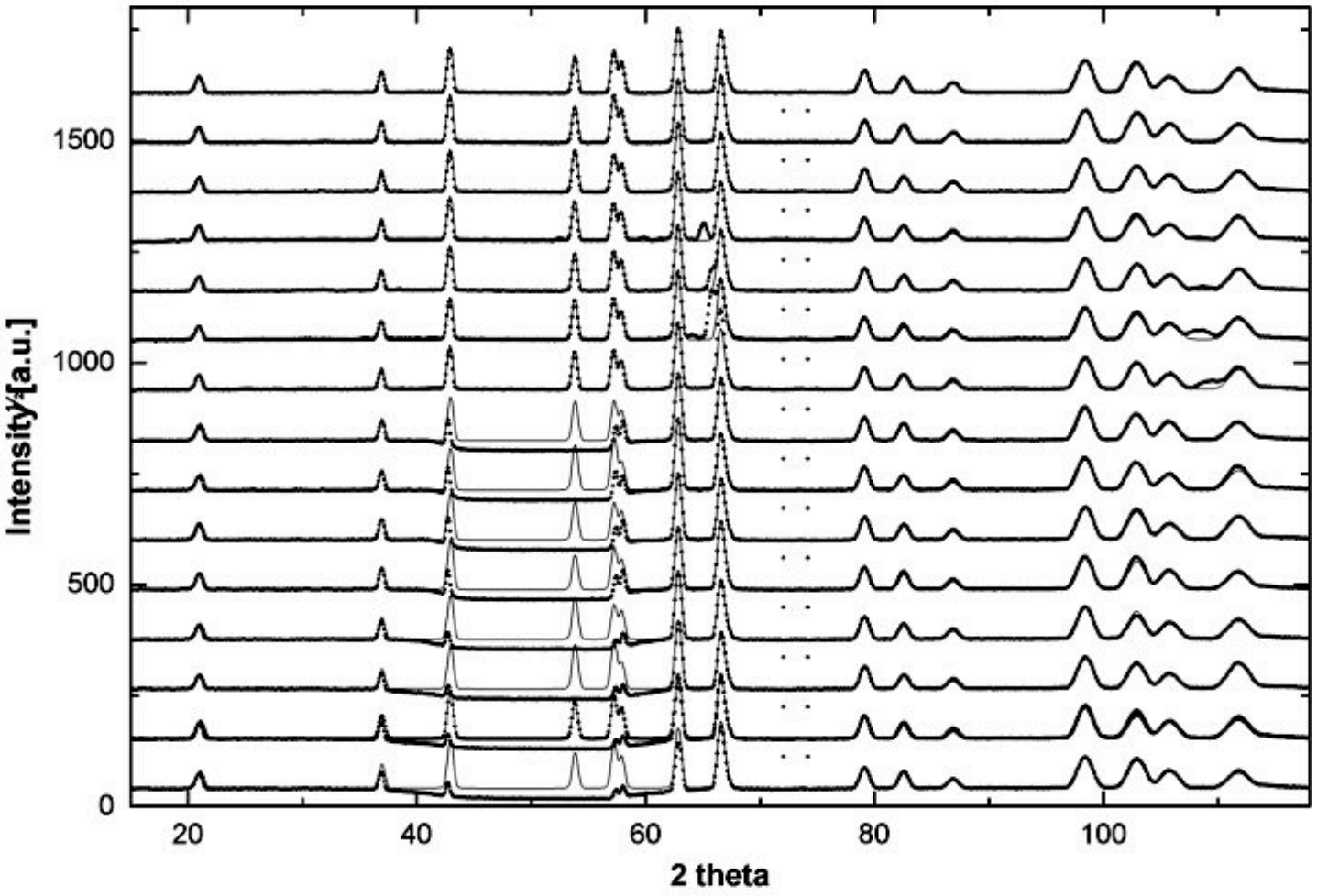
SiC: experimental and reconstructed pole figures



Si_3N_4: experimental and reconstructed pole figures



Kryptonite spectra fitted



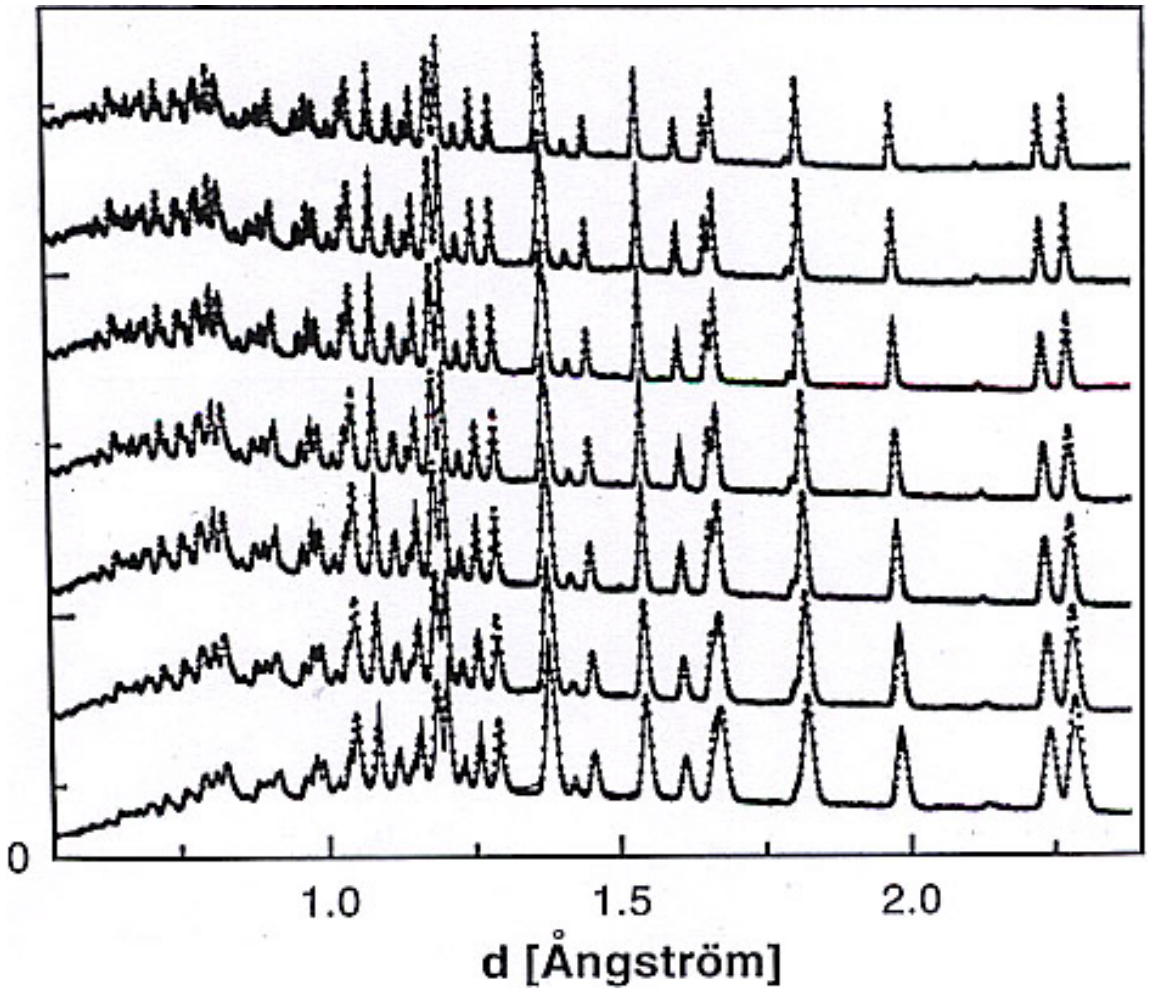
Kryptonite results

- SiC distributed mainly in the basal plane of the composite
  - Optimum in plane mechanical properties of the composites
- β-Si_3N_4 has a random ODF
- SiC volume fraction: 24.2 %

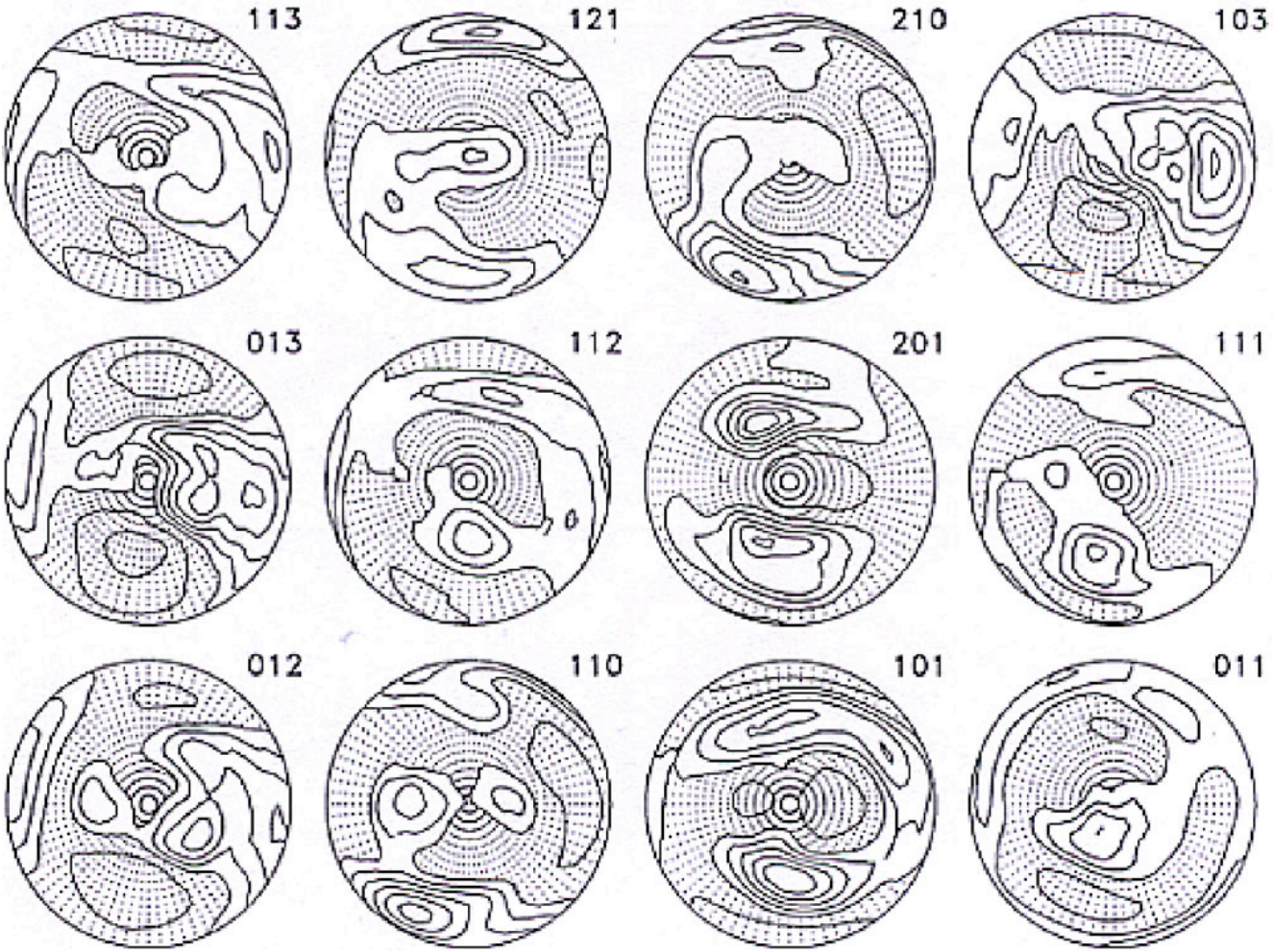
The metamorphic quartzite

- **Sample:**
  - Clast from a metaconglomerate in Wildrose Canyon (Death Valley National Park, California)
  - Cylindrical sample, 2 cm diameter for 2 cm long
- **Data collection:**
  - Neutron TOF at JINR-Dubna (Russia, pulsed reactor IBR-2) (K. Ullmeyer)
  - 7 detectors at two different positions and one axis sample rotation lead to 650 spectra at the constant grid resolution of 7.2° (15 minutes for each position).
- **Analysis:**
  - Analysed range of 0.5-3.5 Angstrom (527 reflections)
  - Only 301 spectra used (to reduce memory consumption)
  - Only reflections stronger than 10 % (and 5 %) of the strongest were used for texture analysis corresponding to 37 reflections (62).
  - Crystal structure of α-Quartz assumed

Quartzite TOF spectra fitted (some)



Sigma section of the quartzite ODF



Quartzite results

- Using 62 peaks instead of 37 for texture analysis did not shown remarkable improvements
- Agreement between the ODF so determined and the optical measurements

- Crystal structure refinement

Space Group	a [Angstrom]	c [Angstrom]	Si (x,x,0)	B_{Si} [Angstrom^2]	O (x,y,z)	B_O [Angstrom^2]
$P3_221$	4.91393(5)	5.40394(9)	0.46323(7)	0.4(2)	0.41047(5) 0.26474(5) 0.78471(3)	0.7(1)