

Rietveld analysis with Maud: the absorption case and Hippo

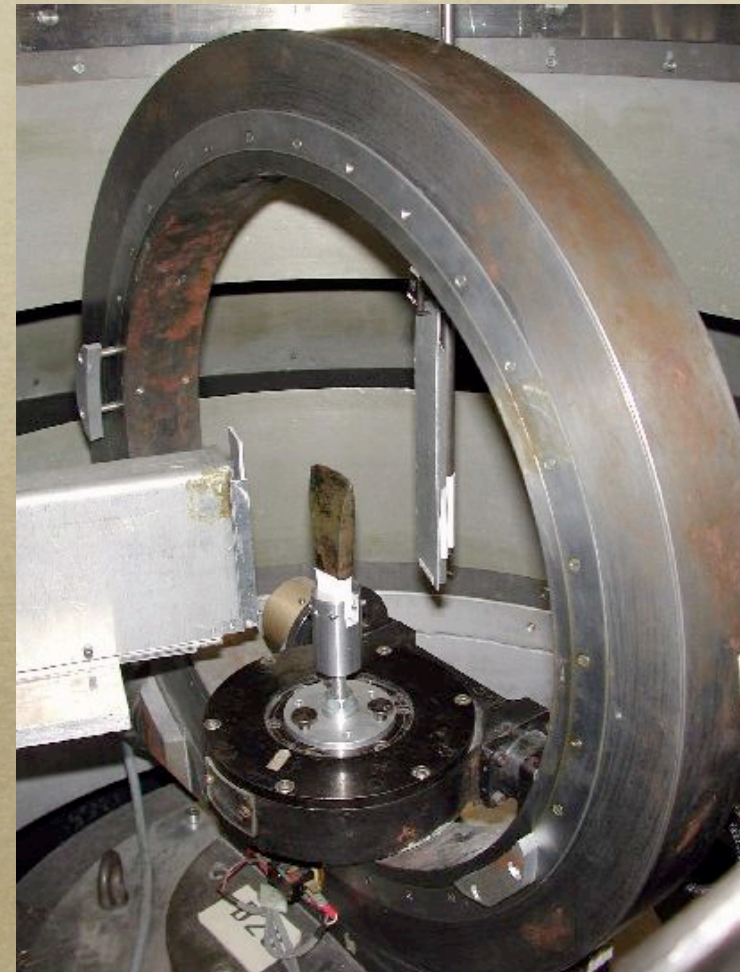
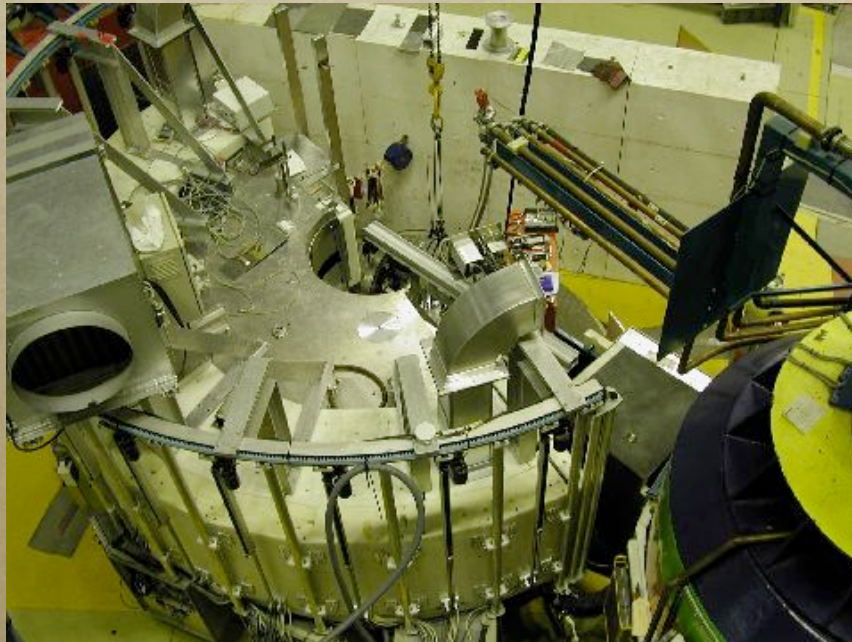
Luca Lutterotti & Rudy Wenk

The Iceman copper axe



- *Texture to understand manufacture*
- *How to get the texture?*

Measurement at ILL-D20



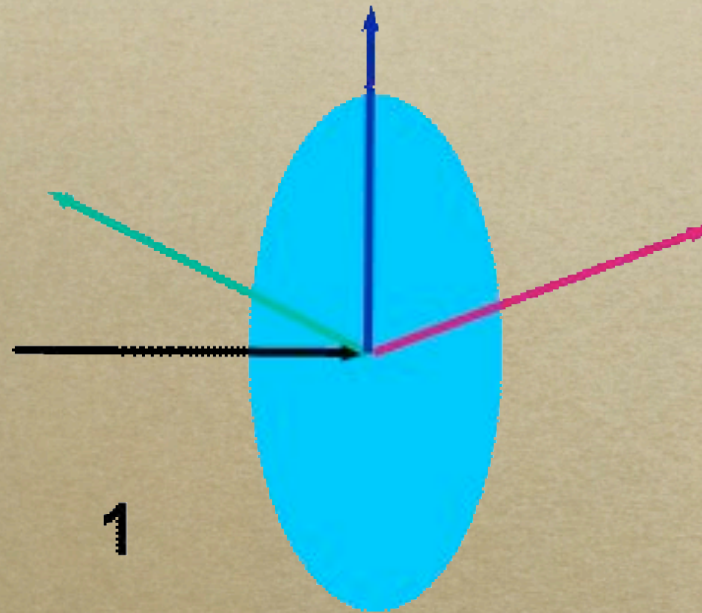
□ *The axe mounted*

How to deal with absorption

- *In Maud:*

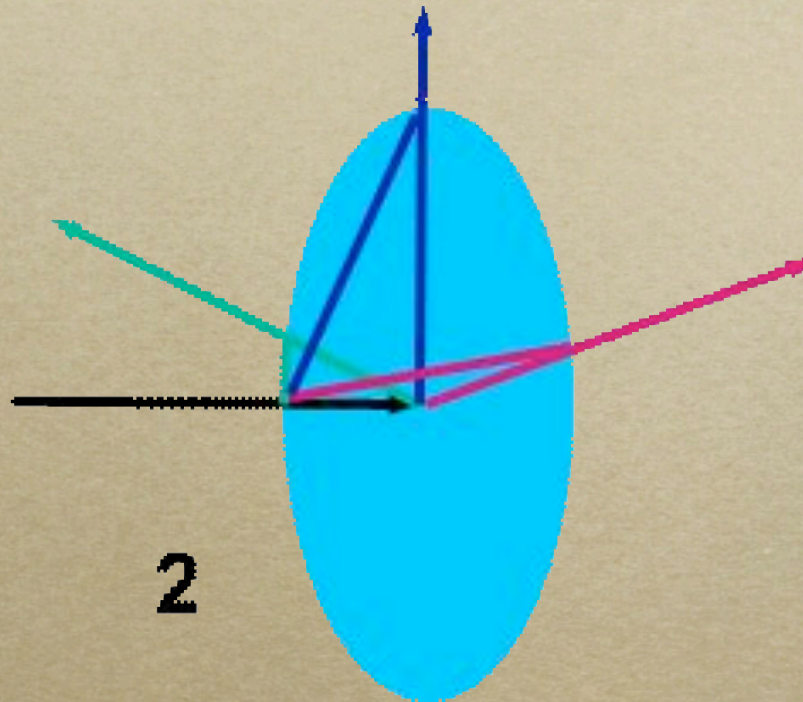
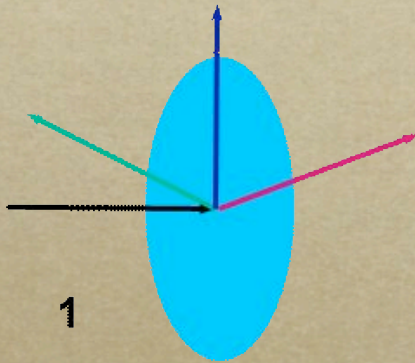
- *Sample shape described by the Popa harmonic expansion developed for crystallites*
- *Two models for integrating the absorption path:*
 - *Analytical approximated model*
 - *Discretization in cells*
- *Problems:*
 - *Discretization is slow + border problem*
 - *Approximation requires one adjustable parameter + velocity problem*

The analytical approximation



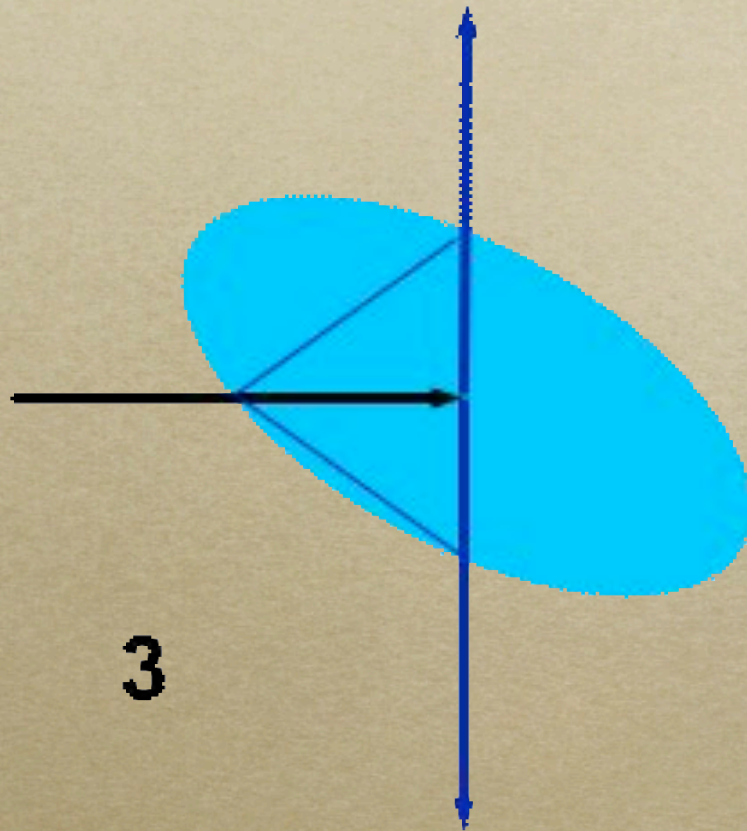
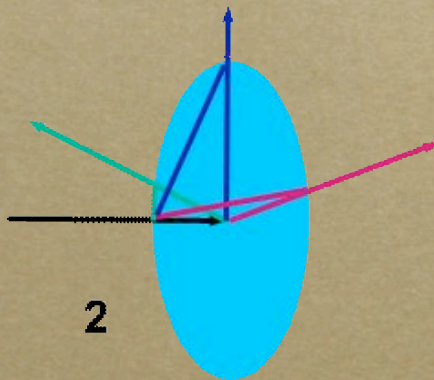
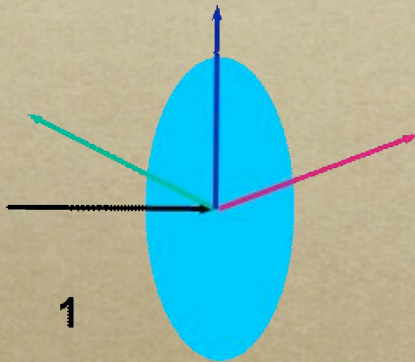
□ $A = e^{-\mu x}$ *what could be x*

The analytical approximation



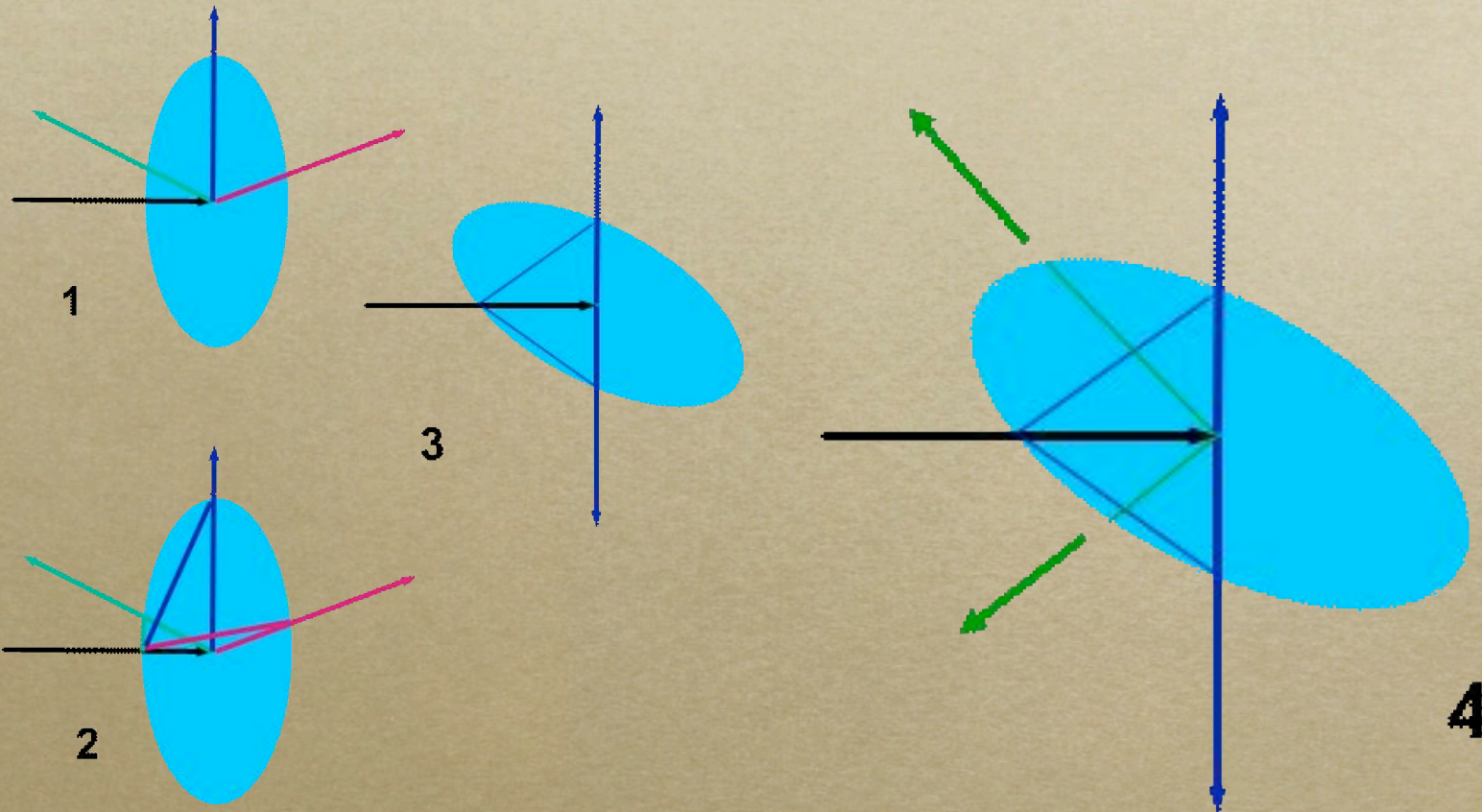
$$A = e^{-\mu x} \text{ what could be } x$$

The analytical approximation



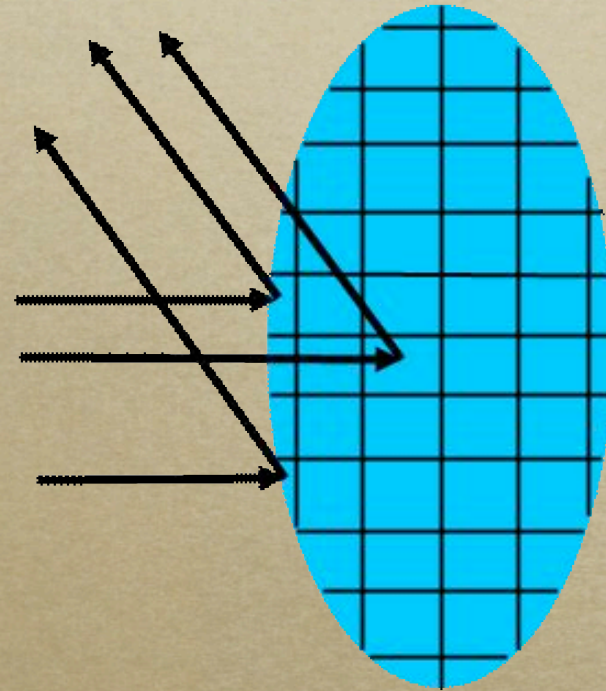
$A = e^{-\mu x}$ what could be x

The analytical approximation



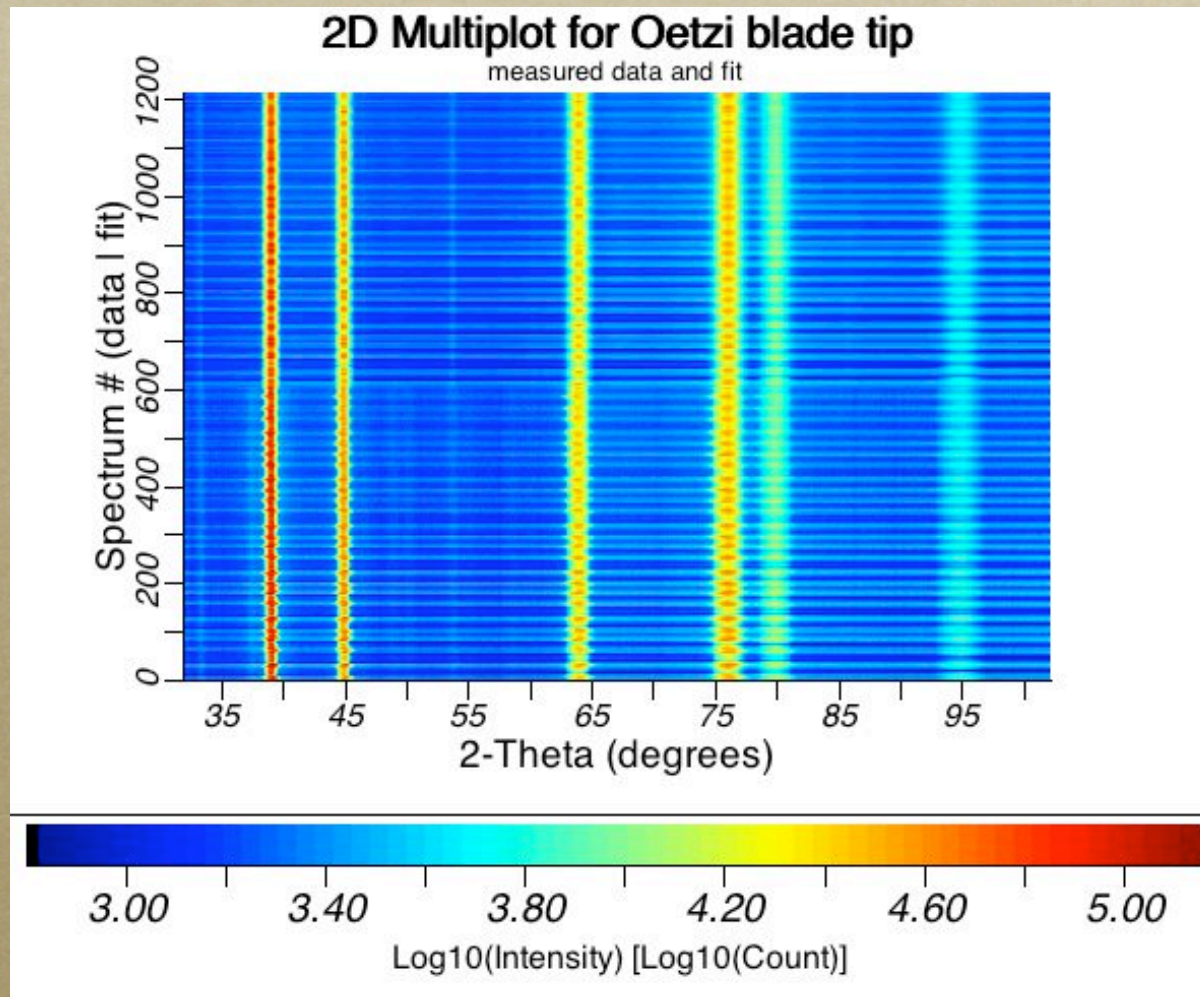
$A = e^{-\mu x}$ what could be x

Discretization

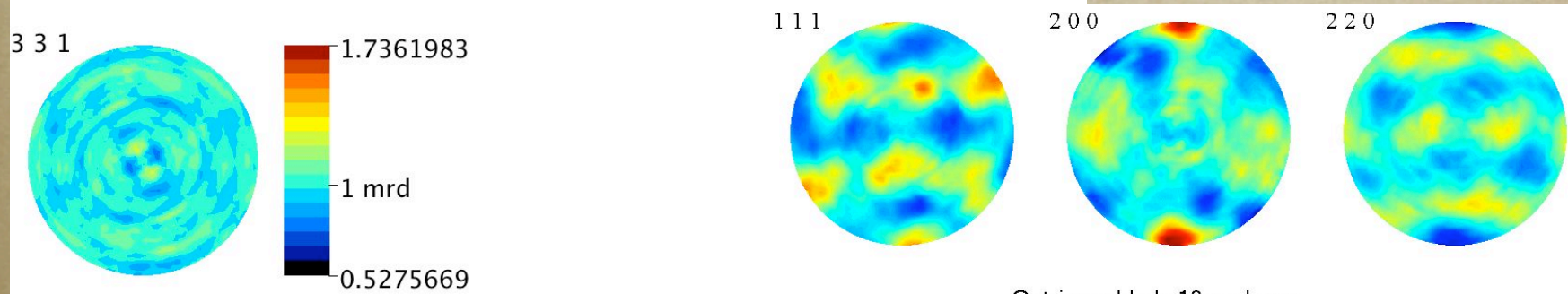
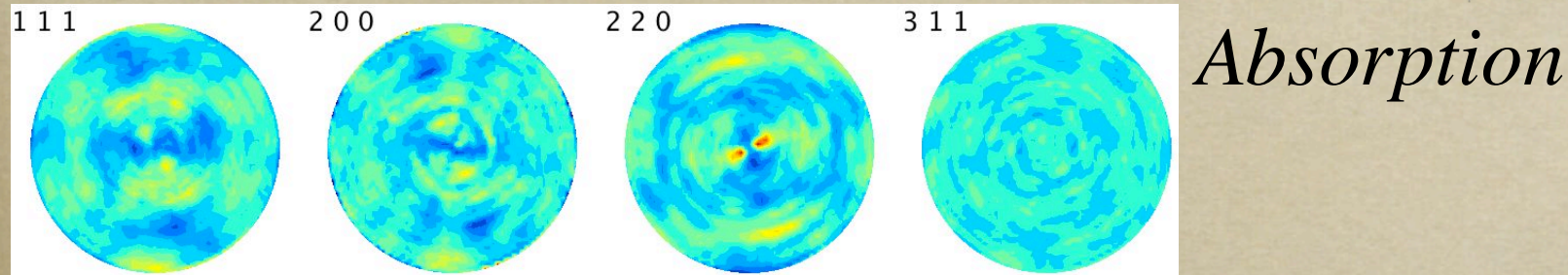


- *Problems on the cells at the border*
- *Integration is slow*

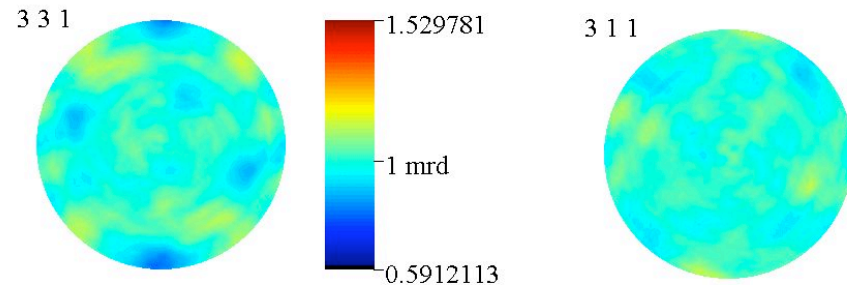
The spectra measured and fitted



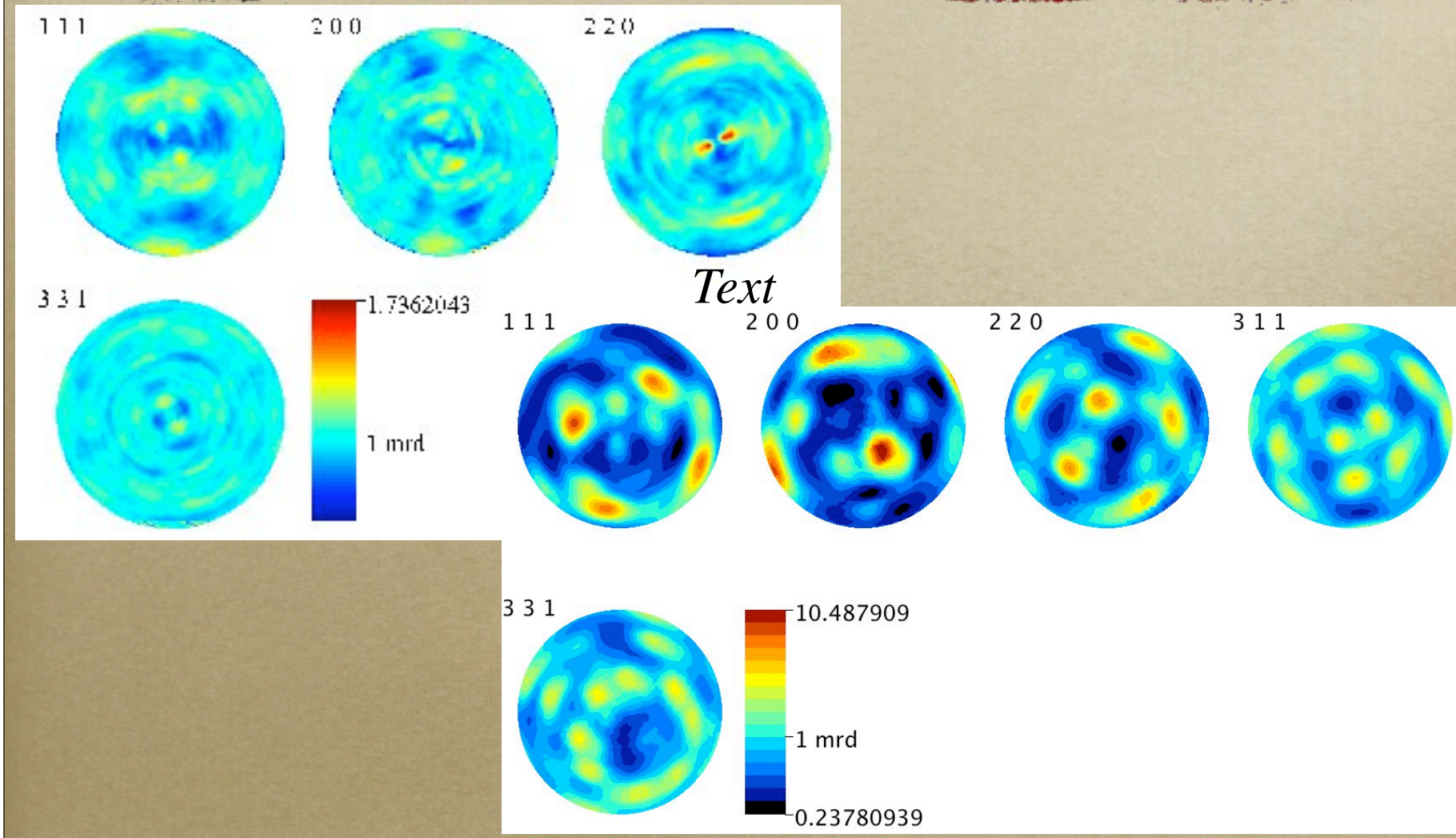
The Iceman axe texture



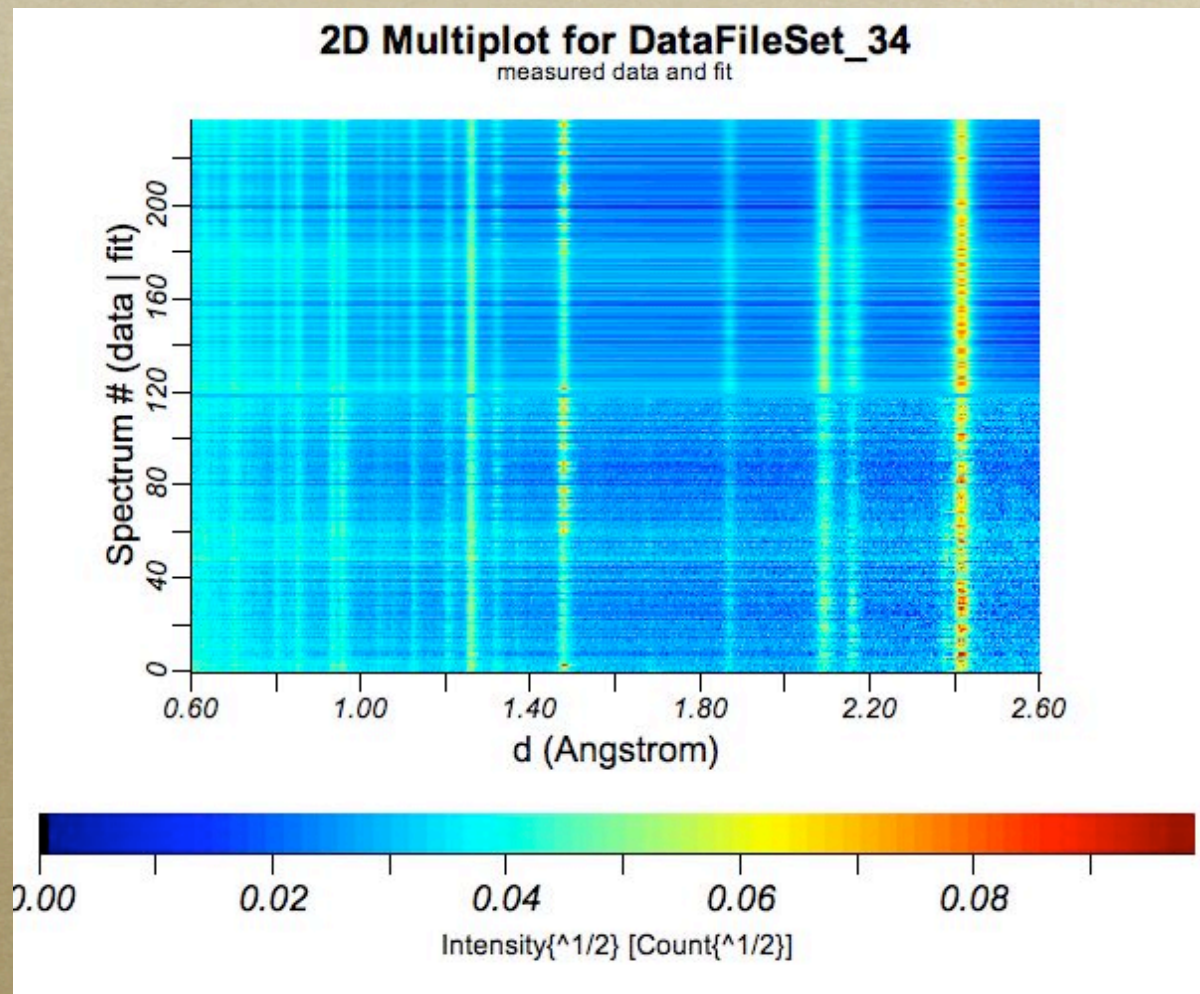
Oetzi axe: blade 10mm beam



The Iceman vs. Castelrotto axes



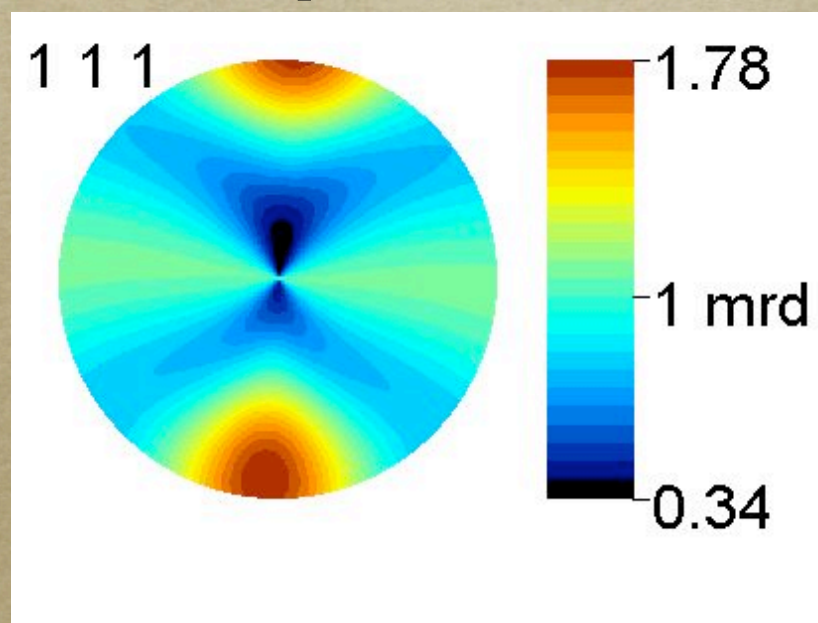
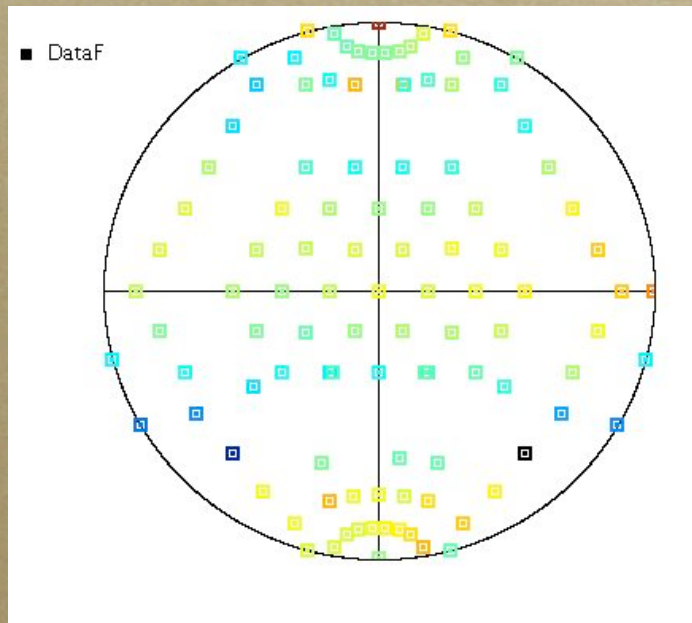
The coin case (HIPD) by Maud



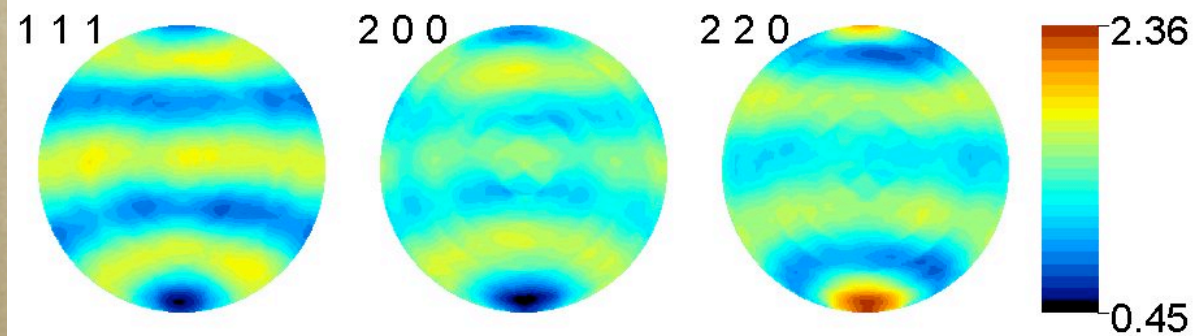
The coin case (HIPD)

- coin 2B
- Bank 3 and 4
- Scale factor refined and plotted by thermal colors

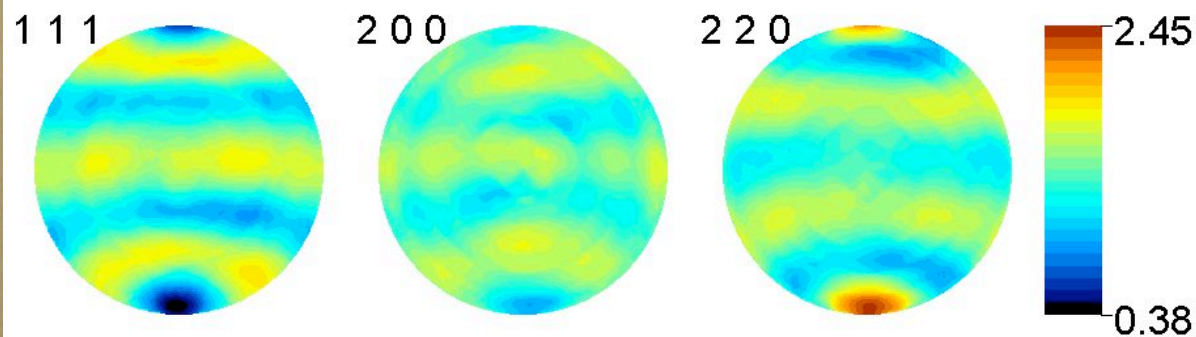
- Absorption correction by the analytical approximation
- cylindrical shape
- Slightly better fitting ($< \text{pars}$)
- 90° bank plotted



Coin: reconstructed pole figures



Silver

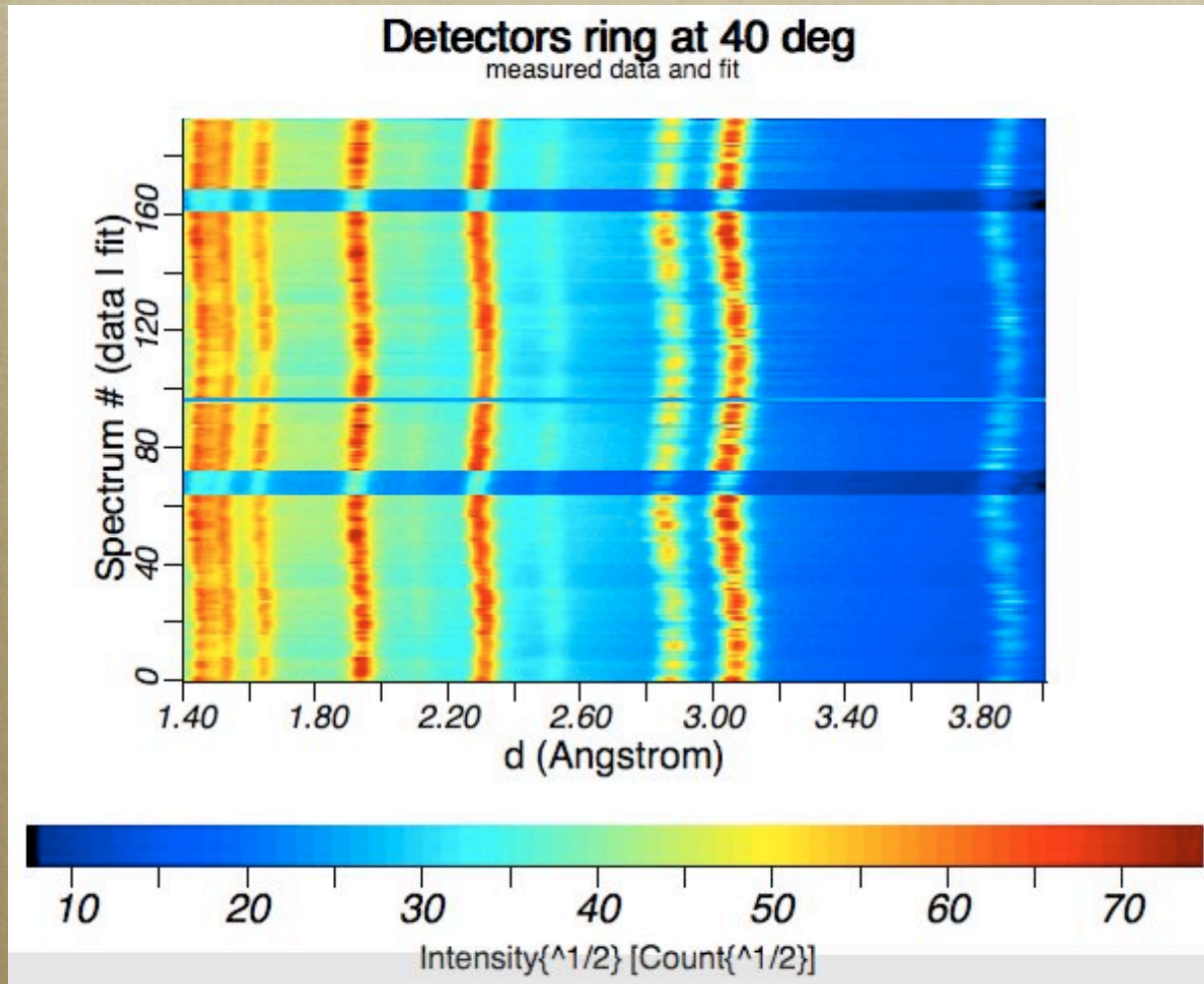


Copper

Hippo

- *Early measurements and some problems:*
 - *Intensities changing by rotation and in time*
 - *Peak positions changing also*

Modeling the problems in Maud

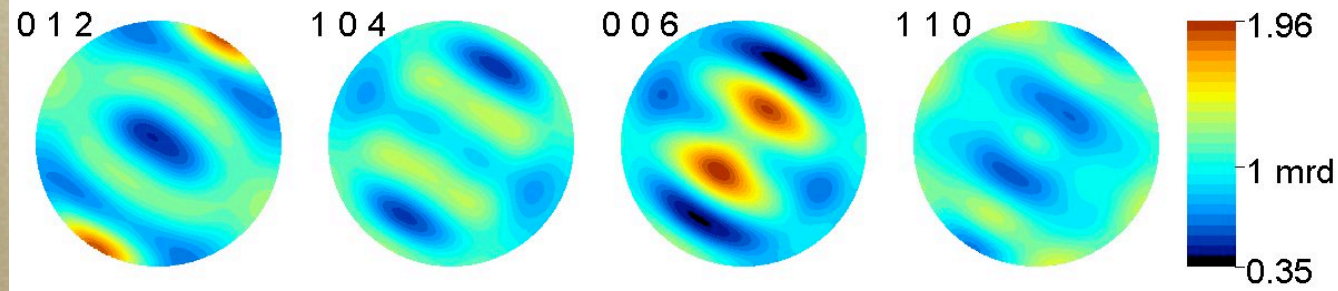


- *Limestone standard*

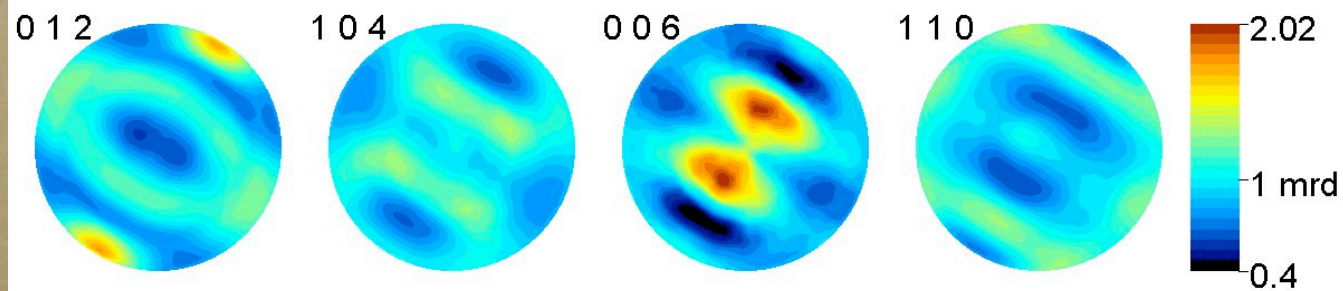
- *Precession error*

- *Sample position*

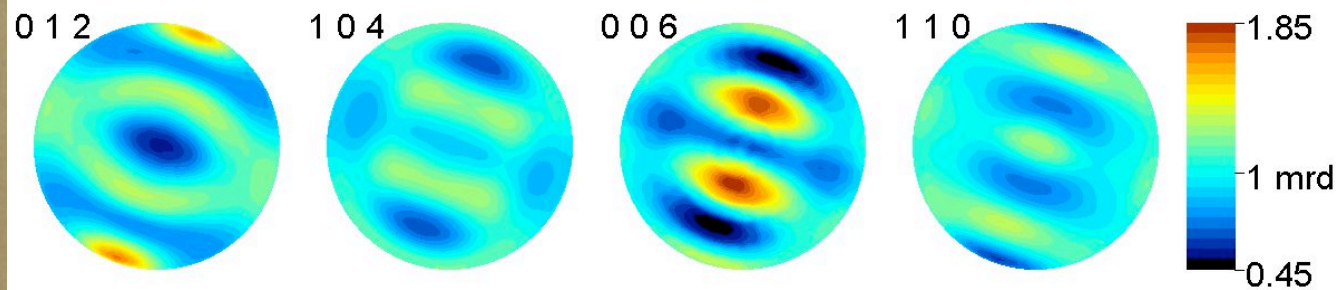
The pole figures of limestone



Harmonic



EWIMV



EWIMV at D20