



## Selected Applications of MIMOS II in Archaeology

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# Outlook

- **Motivation**
- **MIMOS II / Space Payload Constraints**
- **Chinese Wall Painting**
- **Pigments on a Greek Vase**
- **Were Celtic weapons burnt in sacrifices?**
- **Miniature from the XV Century**
- **Supporting Restoration of a Roman Mask**
- **Black gloss on antique Greek pottery**
- **Rock paintings**

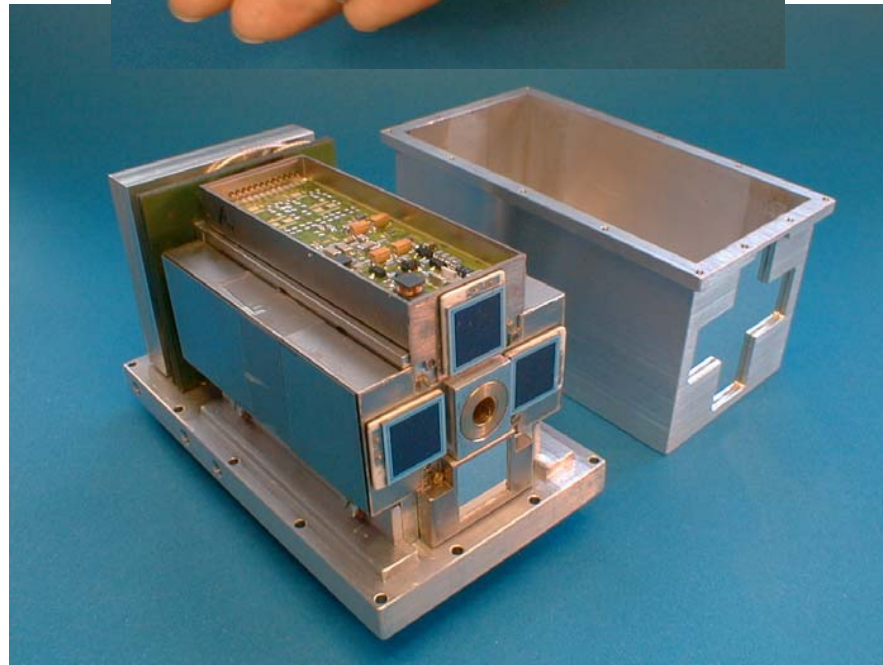
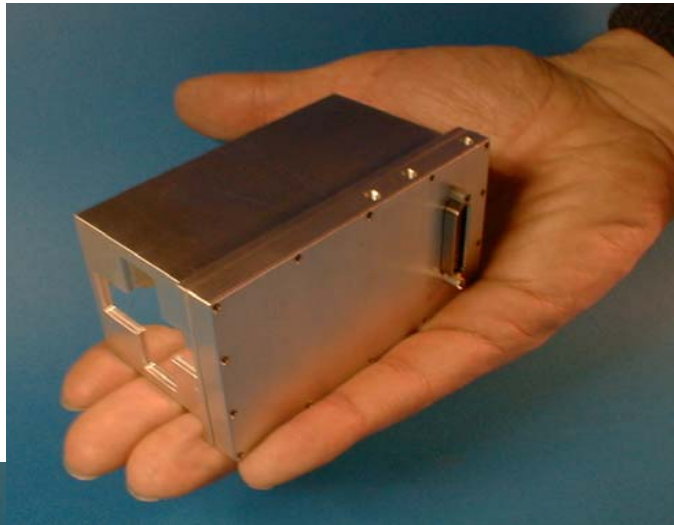


# Motivation

- Archaeological artefacts are unique pieces
- Non-destructive analysis is necessary
- **MIMOS II:**
  - Works in backscattering geometry
  - Does not require sample preparation
  - Is Portable

# Selected Applications of MIMOS II in Archaeology

- Weight (~ 400 g)
- Power (~ 3 W)
- Size (5x5x9) cm<sup>3</sup>
- Backscattering
- Internal calibration

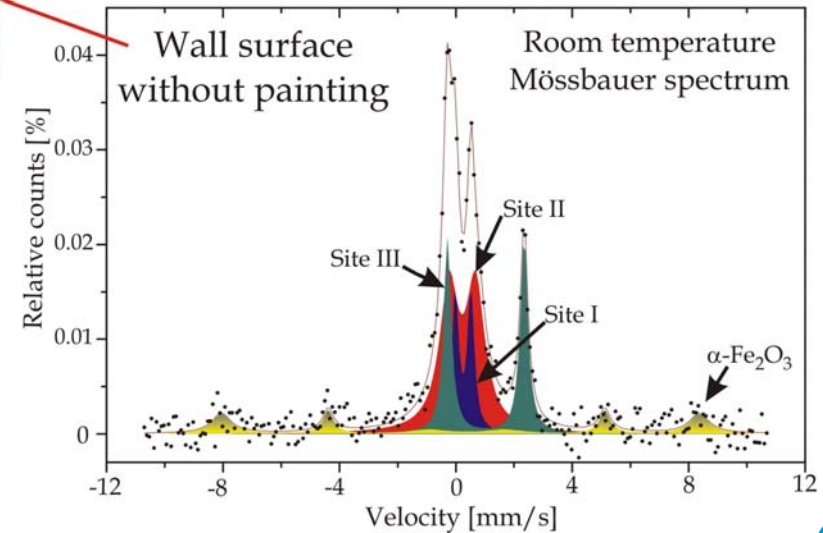
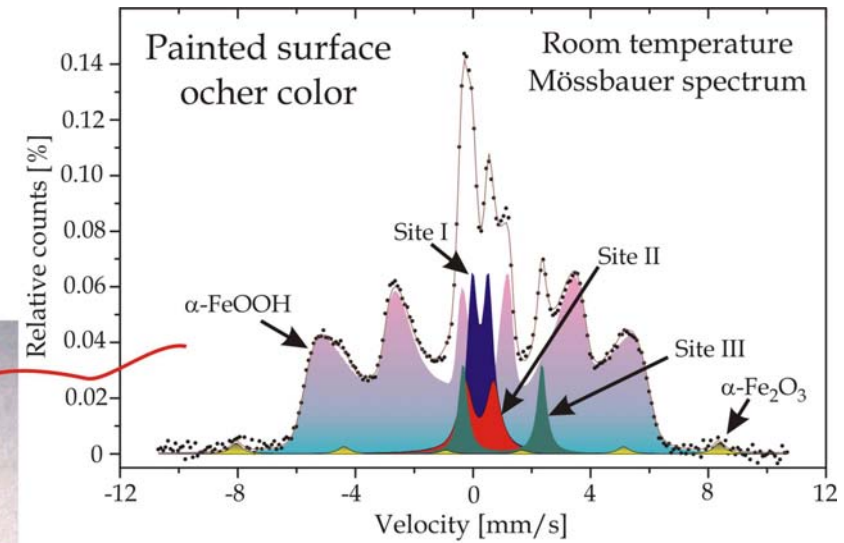
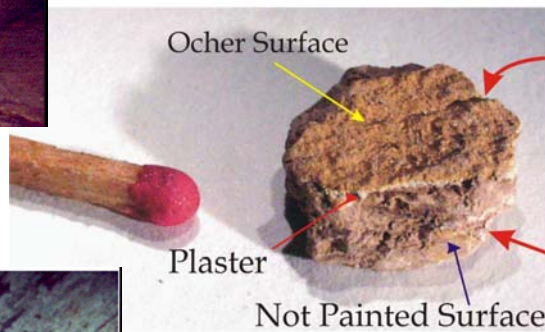


# Chinese Wall Painting





# Chinese wall painting (Eastern-Han Dynasty)



# Pigments on a Greek Vase

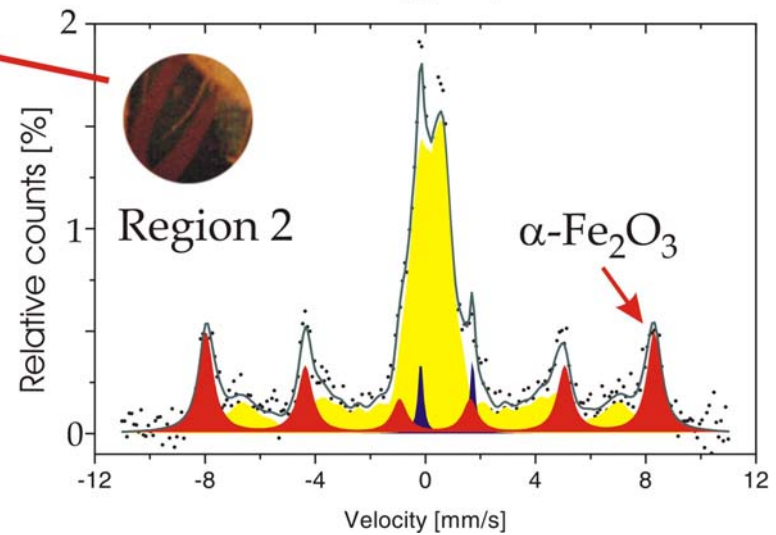
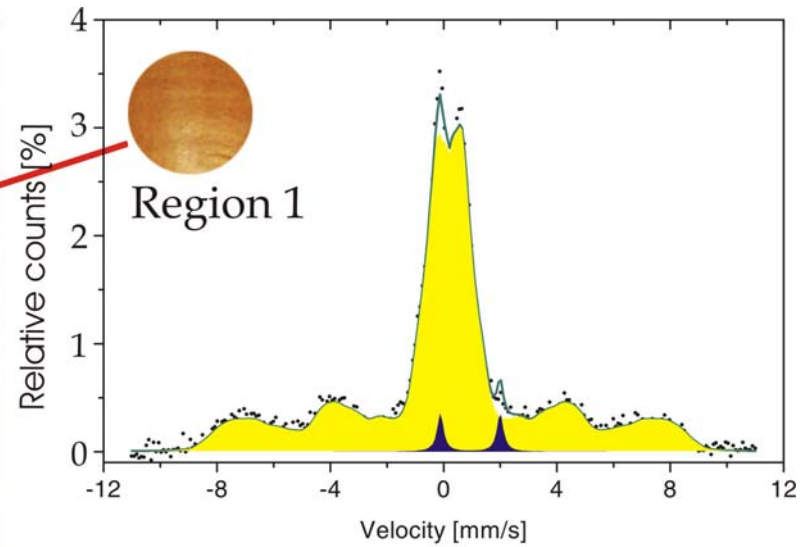
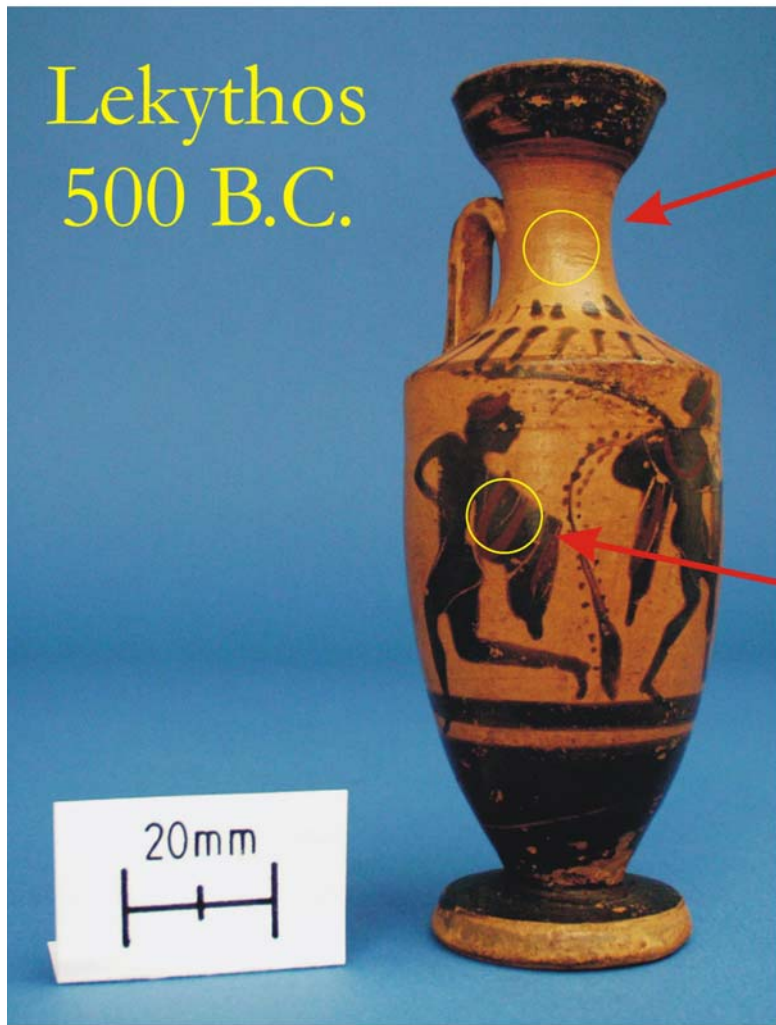


# Pigments on a Greek Vase





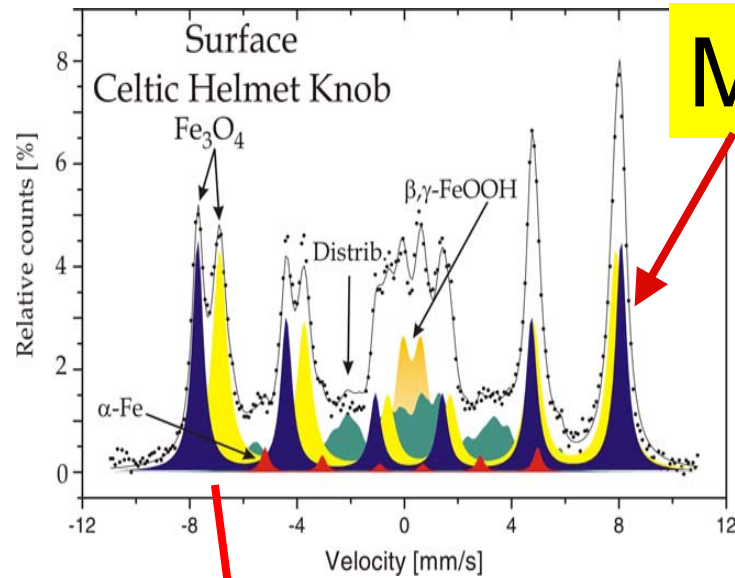
# Pigments on a Greek Vase



# Were Celtic weapons burnt in sacrifices?

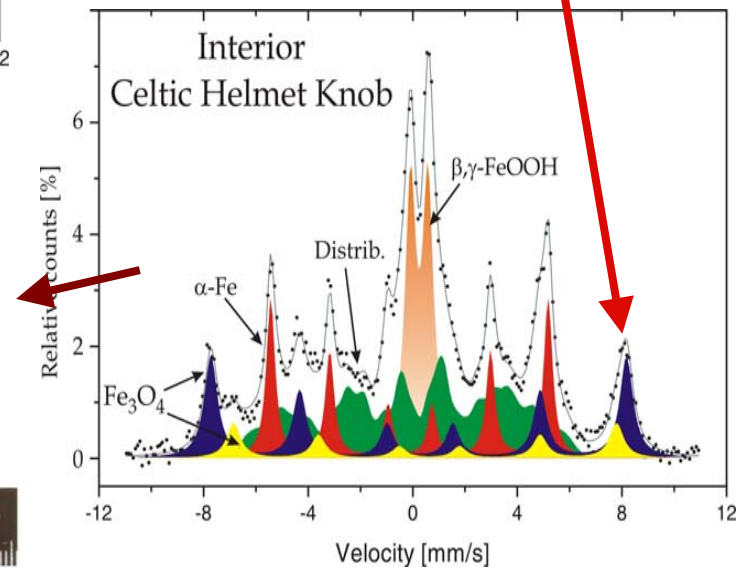


# Helmet Knob: burnt in sacrifices?



Magnetite

Magnetite  
and  
Maghemite



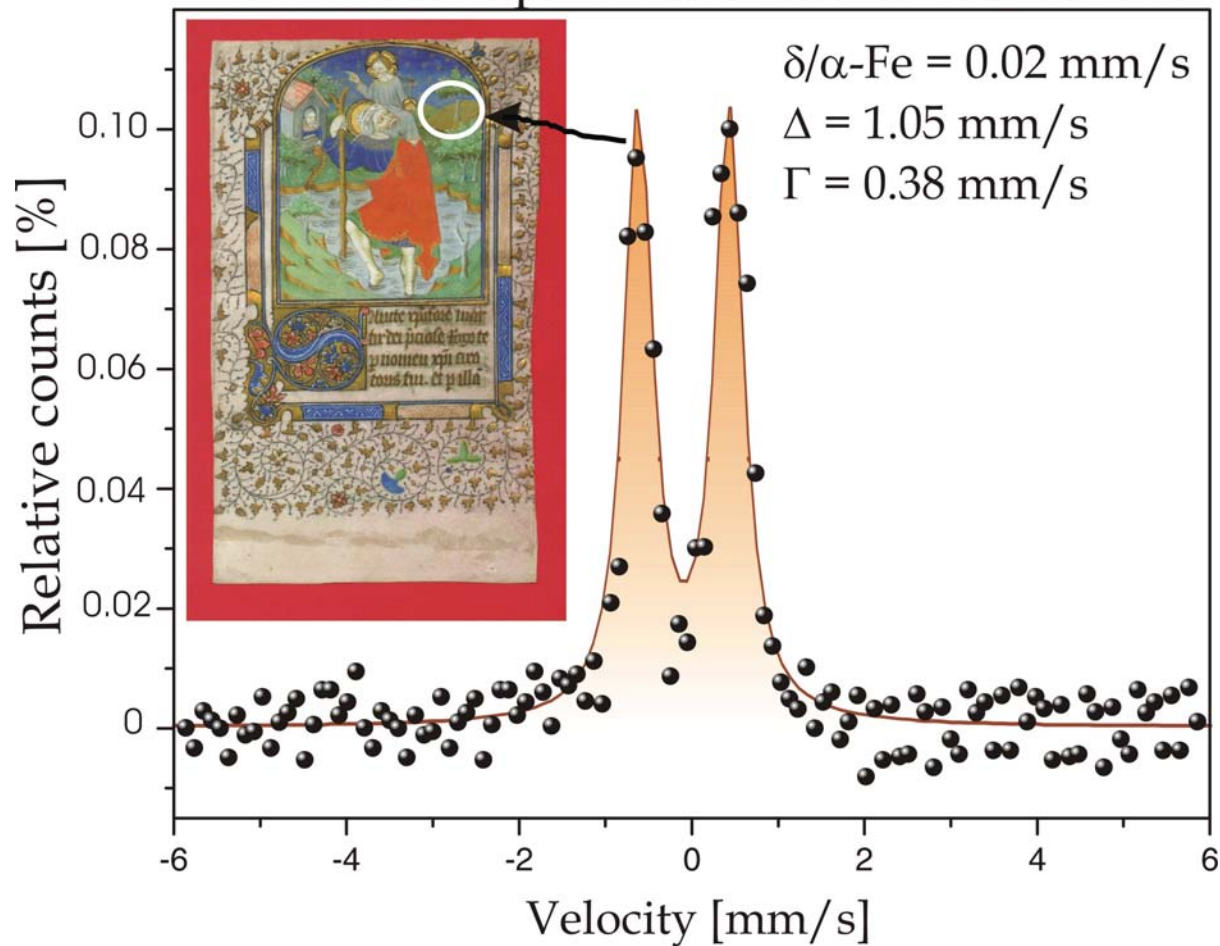
# Miniature from XV Century





# Miniature from XV Century

Least-squares fitted room temperature  
Mössbauer spectrum from the miniature



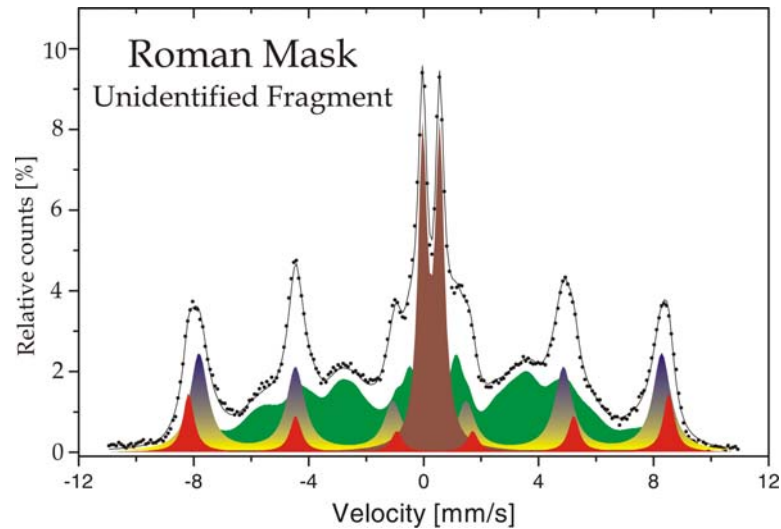
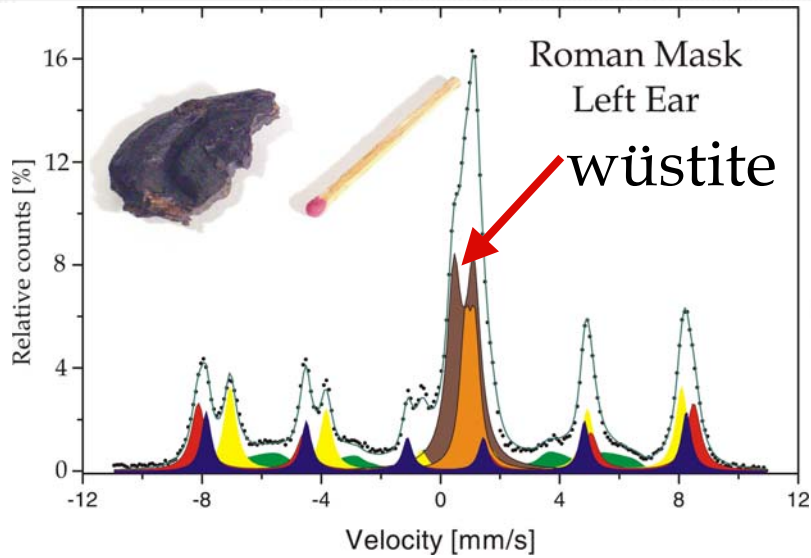
4 ½ days,  
80 mCi source.

Artefact kindly provided by Gutenberg Museum in Mainz

# Restoration of a Roman Mask



# Restoration of a Roman Mask



# Black gloss on antique Greek pottery



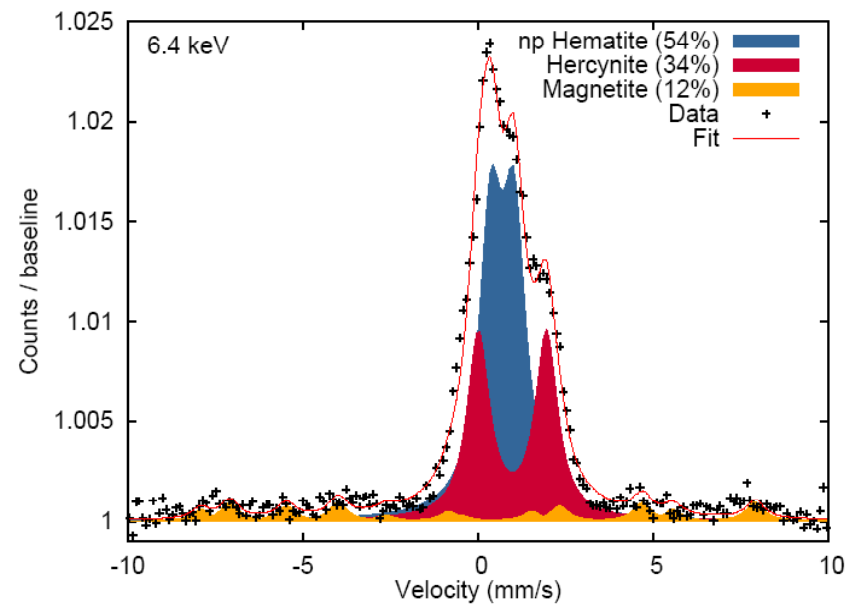
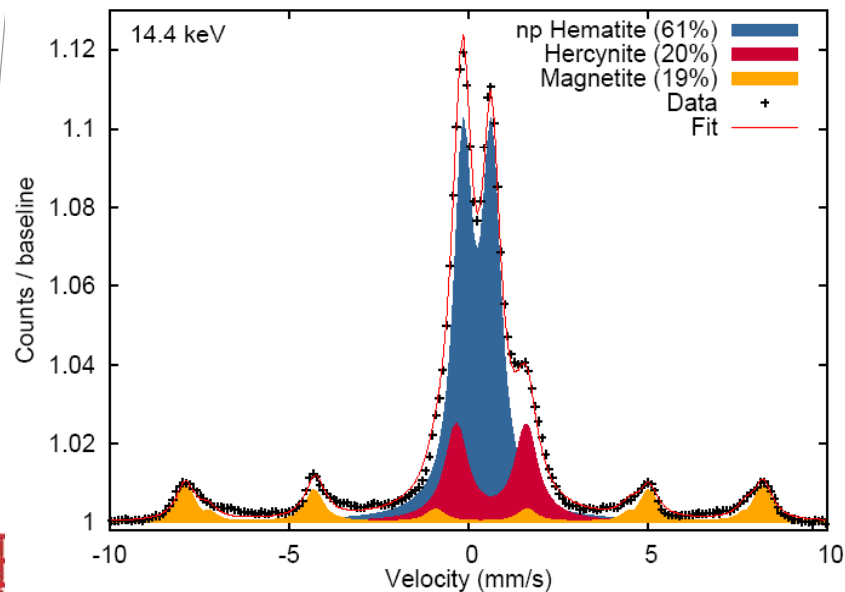


# Black gloss on antique Greek Pottery



Sherd from attic red-figure kylix investigated with depth-selective Mössbauer spectroscopy

black gloss: enriched in hercynite ( $\text{FeAl}_2\text{O}_4$ )



# Rock Paintings

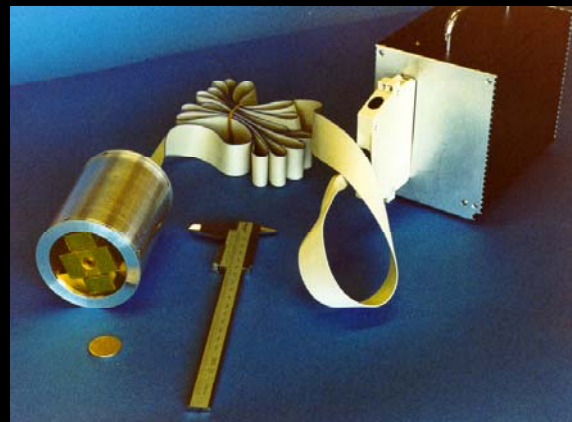
Santana do Riacho, MG,  
Brasil



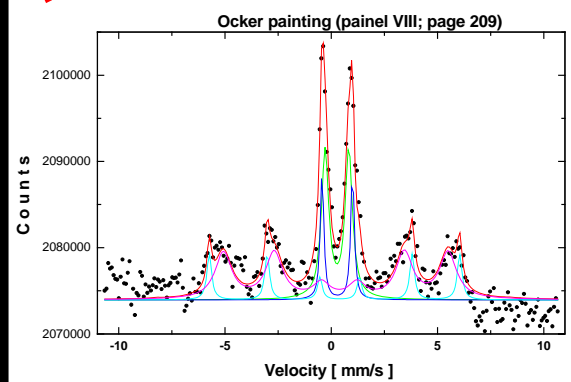
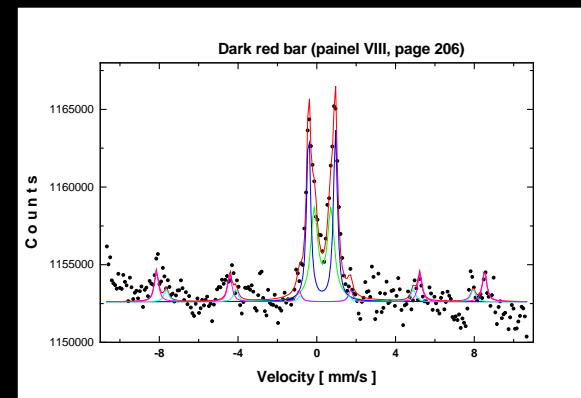
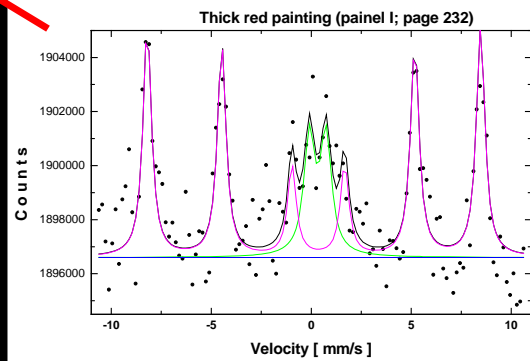
# Location of the archaeological site of Santana do Riacho



**Brazilian Beer Can**









# Conclusions



# Conclusions

- MIMOS II is a suitable tool for archaeological applications.
- MIMOS II could provide non-destructive analysis of a variety of archaeological artefacts.
- Data from MIMOS II supported hypothesis of burning weapons after battles (magnetite to maghemite)
- Data from MIMOS II supported the restoration of a roman mask.
- Depth selective Mössbauer spectroscopy with MIMOS II showed an enrichment of hercynite in a black coating on antique Greek pottery.



## Tasmanian ICT Centre

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# Thank you

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