Cathodes
Dark Current and Space Charge

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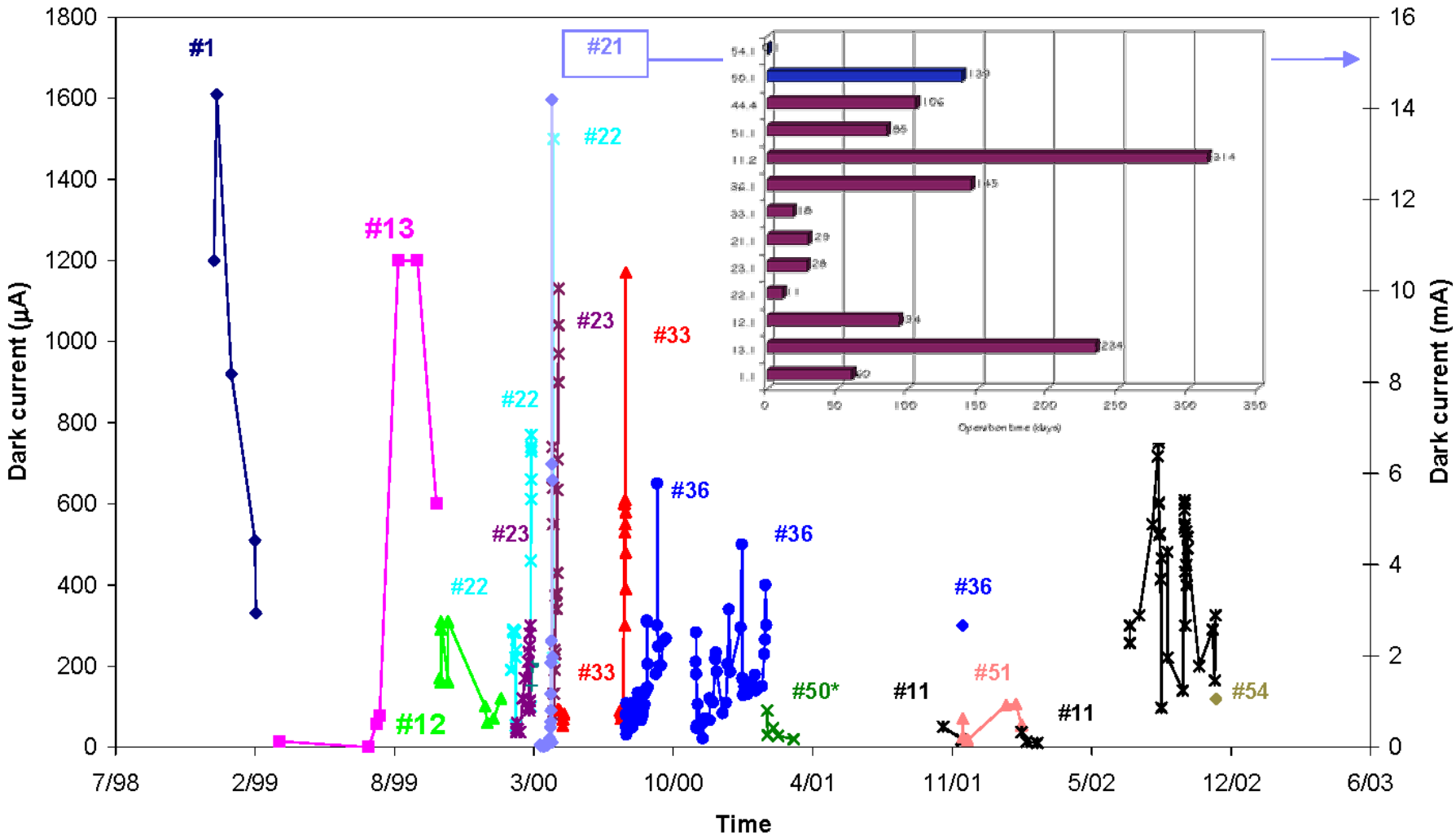
Dark Current Data



Dark Current

- Dark current was the main reason for changing cathode during TTF-I
- To correlate it with other cathode and plug parameters, a database is running in Milano accessible by WEB interface
- We have now update the database with the information from the previous run but now we would like to have it updated "daily"

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Database Scheme

Deposition

PLUG

- Molybdenum rod
- Machining procedures
- Cleaning
- Polishing
- In Vacuum Treatment

CATHODE

- Plug
- QE
- Dark Current

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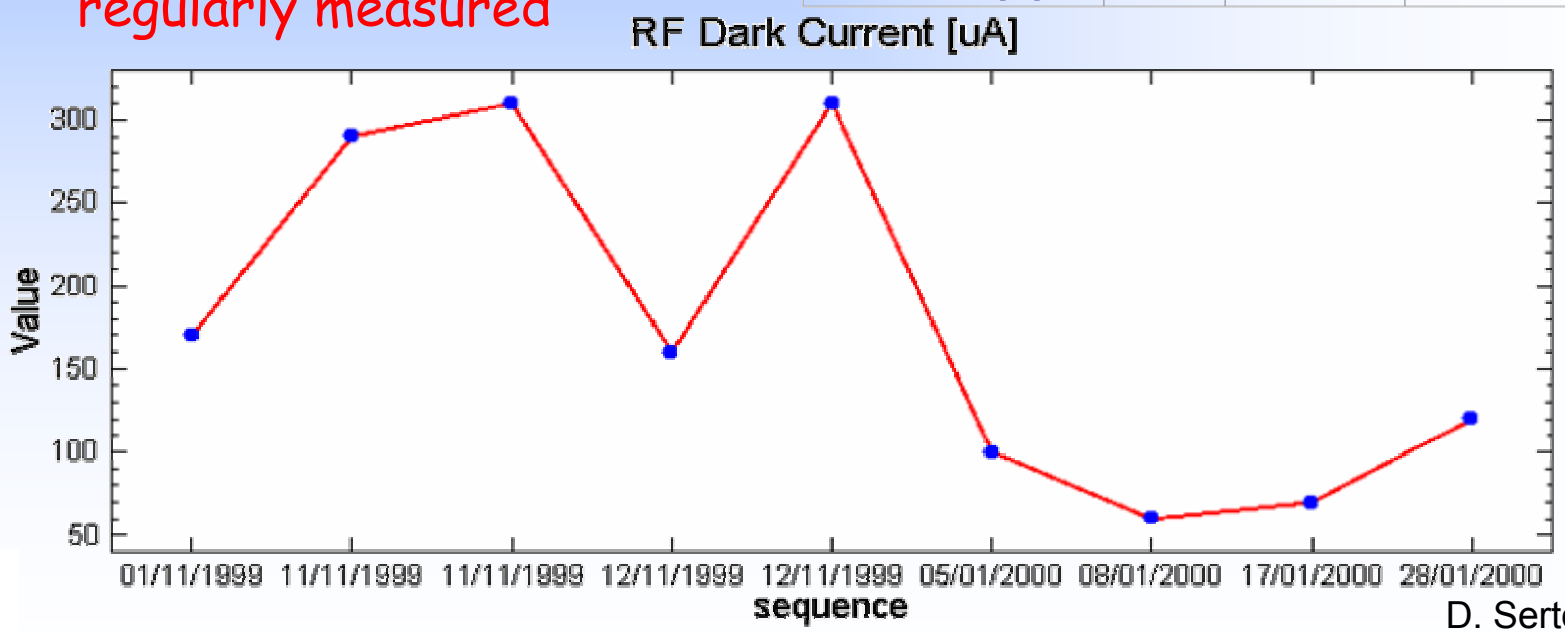
Database Data

QE and dark current measurements available as their plots

Very few QE measurements during operation

Dark Current not regularly measured

Measure	Value	Date	Location
QE [%]	7,5	24/11/1998	LASA
RF Dark Current [uA]	170	01/11/1999	DESY-Hamburg
RF Dark Current [uA]	290	11/11/1999	DESY-Hamburg
RF Dark Current [uA]	310	11/11/1999	DESY-Hamburg
RF Dark Current [uA]	160	12/11/1999	DESY-Hamburg
RF Dark Current [uA]	310	12/11/1999	DESY-Hamburg
RF Dark Current [uA]	100	05/01/2000	DESY-Hamburg
RF Dark Current [uA]	60	08/01/2000	DESY-Hamburg
RF Dark Current [uA]	70	17/01/2000	DESY-Hamburg
RF Dark Current [uA]	120	28/01/2000	DESY-Hamburg



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IMPROVED Database Scheme

Deposition

PLUG

- Molybdenum bar
- Machining procedures
- Cleaning
- Polishing
- In Vacuum Treatment
- ***Reflectivity***

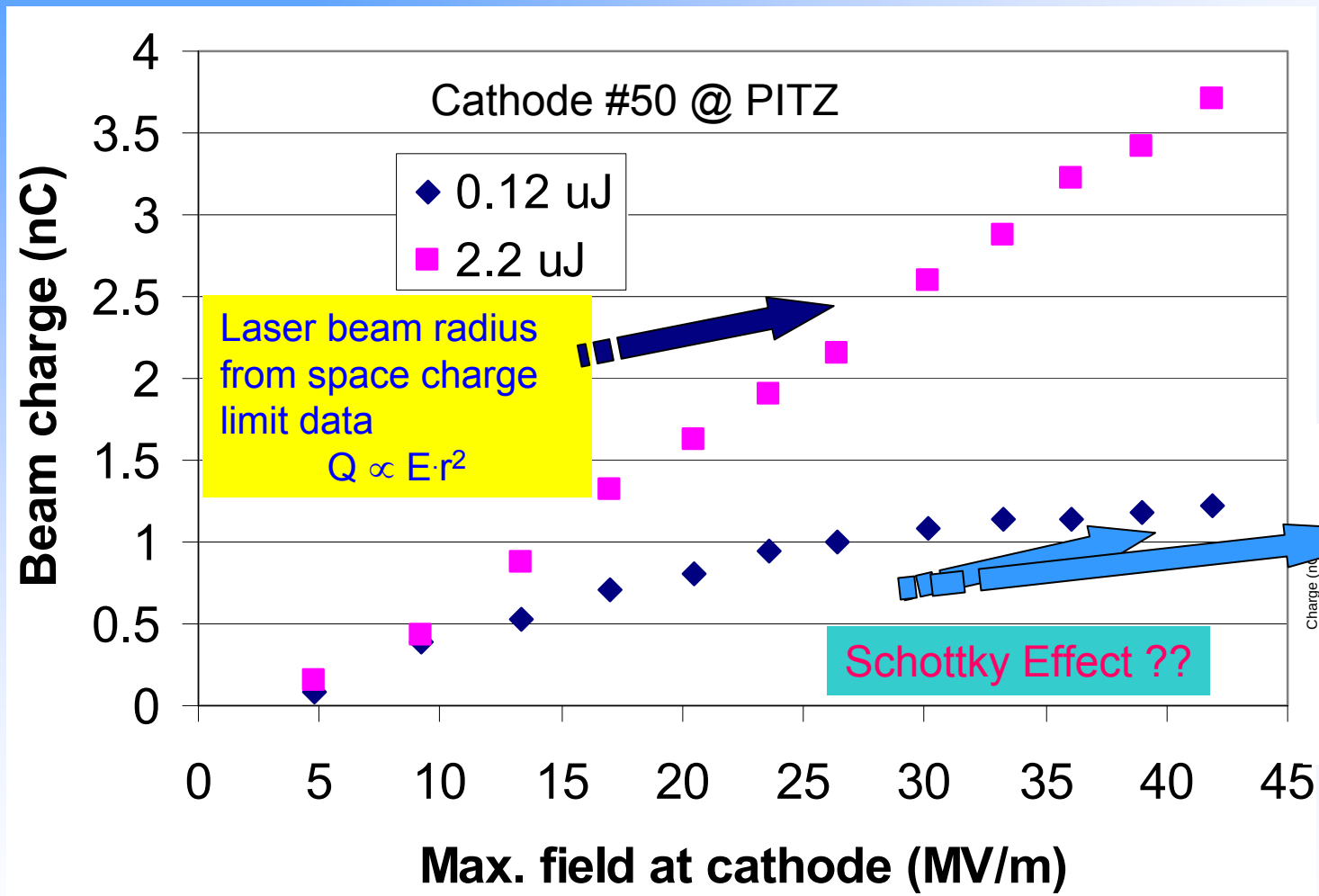
CATHODE

- Plug
- QE
- Dark Current
- ***QE maps***
- ***Pictures***
- ***Microscope scan***

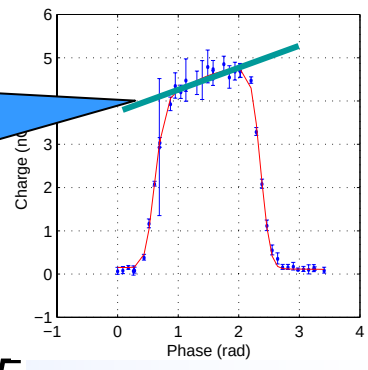
Cathode Measurements

- Intrinsic properties
  - QE
  - Maximum Extracted charge
  - Schottky Effect
    - Cs_2Te is a large E_{gap} semiconductor. How does it behaves?
    - We have to look at:
      - Charge vs. $E_{cathode}$ after saturation !!
      - Phase scan !!
- Laser beam spot size (rough estimate)

An example



Phase Scan



NEW Cathode Measurements

- "Time dependence"
  - Integrated Charge
    - Charge measurement @ gun exit (Integral of charge along the train)
  - QE vs. time
    - Charge @ gun exit and laser energy measurement

We look at DAQ to have them into the database

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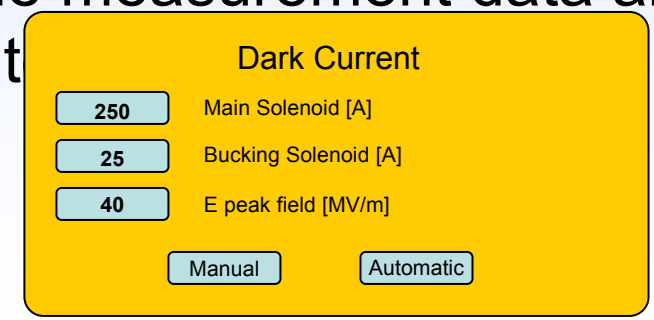
GUI Interface for Operator

- The GUI interface is intended **to help the operator in measuring the dark current and QE and automatically** include the measurement in the database
- We foresee both automatic (when possible) and guided manual procedure
- The important parameters are read from the control system or put in from the operator
- The measurement data are saved locally and aut no



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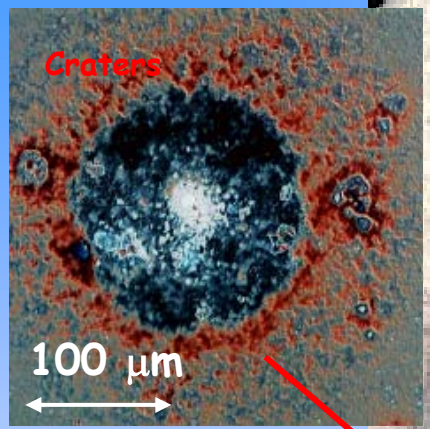
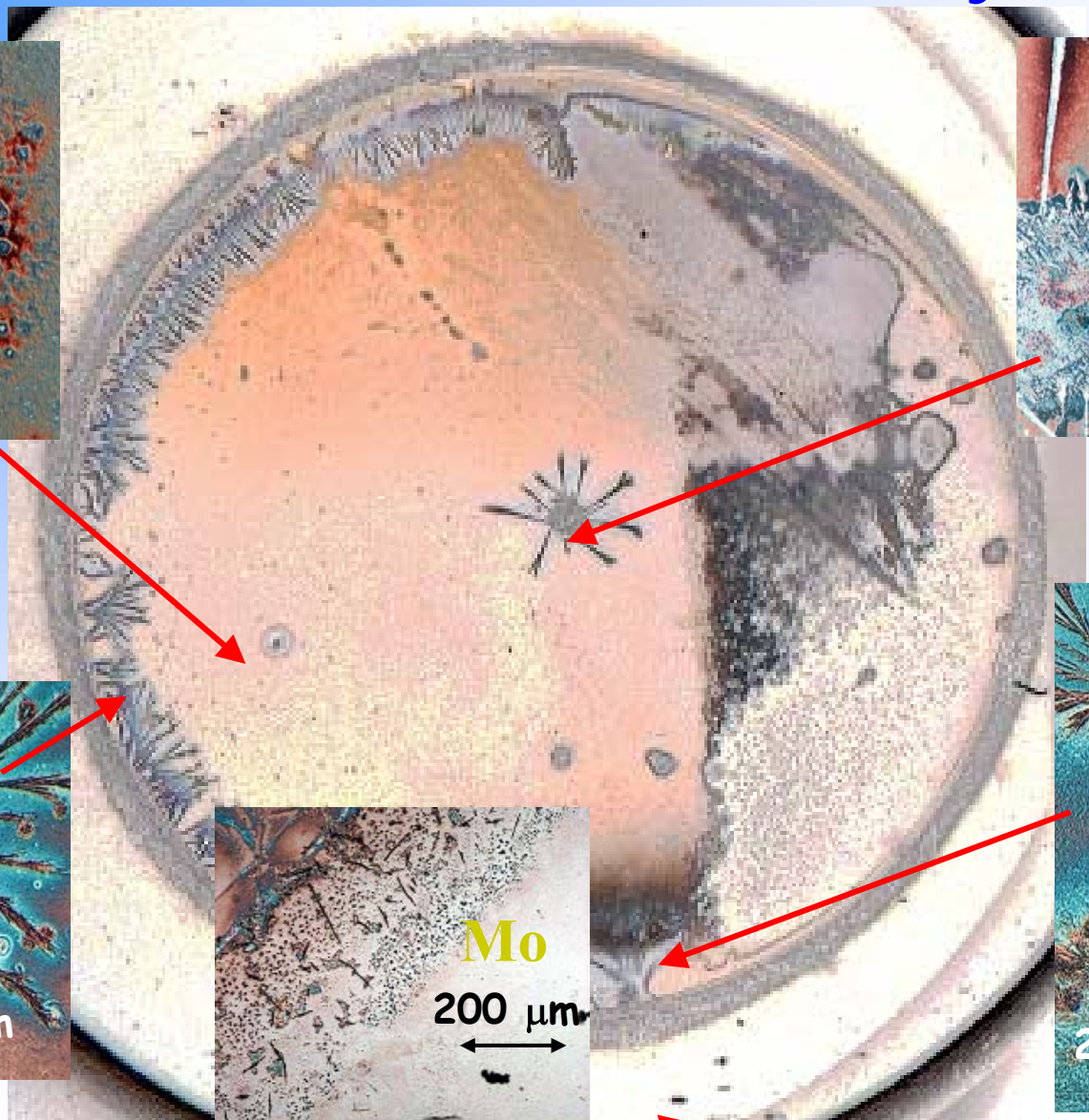
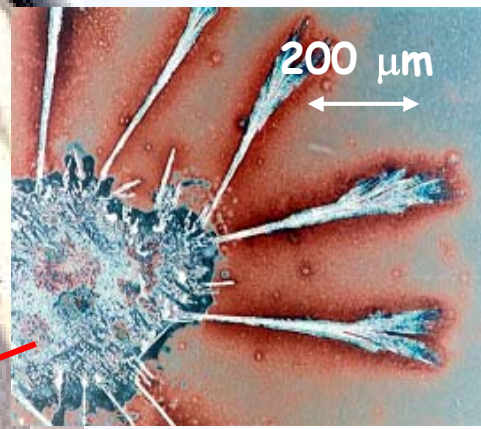
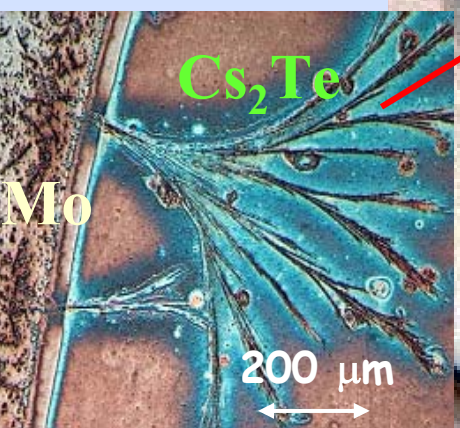
Cathode Visual Analysis

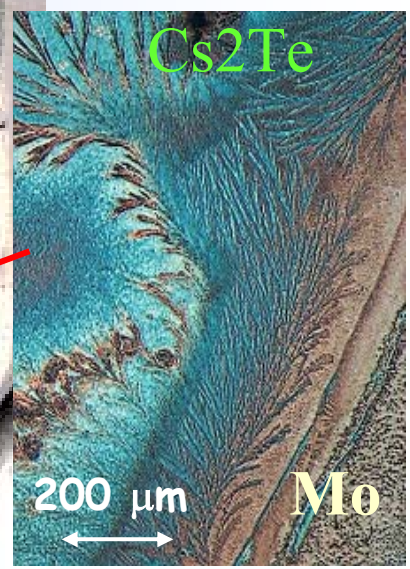






PITZ
44.2 Cs_2Te
May-Sept '03





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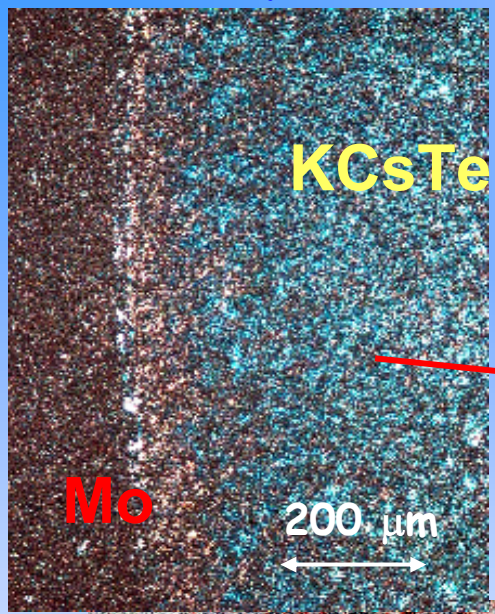
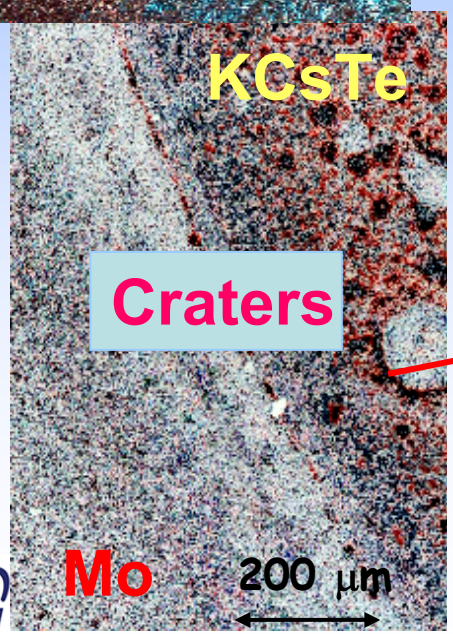
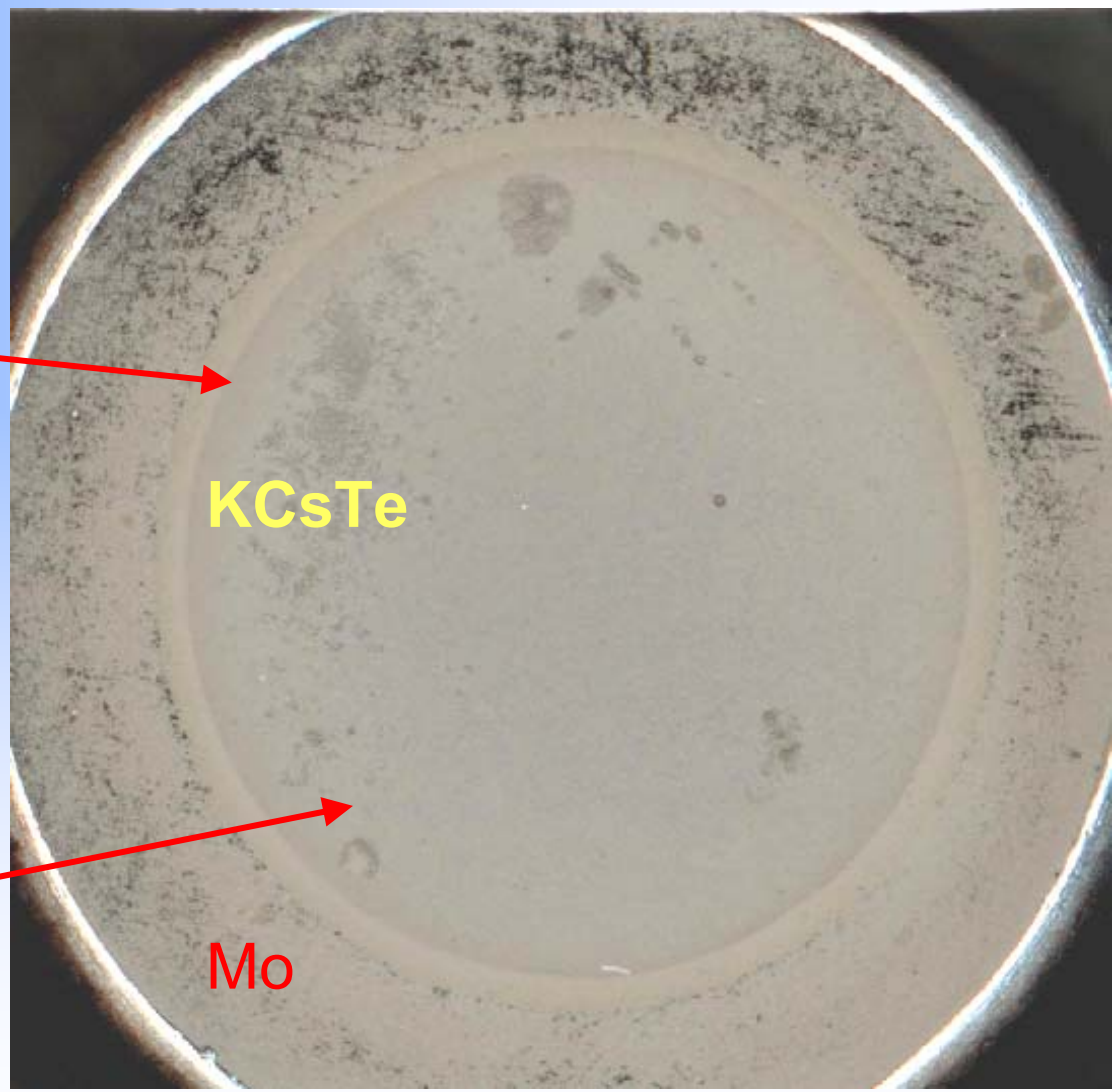
50.1 (KCsTe, Hamburg) [Nov 03 to Feb 04]







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13.1 (Cs_2Te, Hamburg) [1999]