P61B LVP beamline

Satellite Workshop at the DESY User Meeting

Beamline P61 in
Paul P. Ewald hall
(PXN) of PETRA III

Introduction by:

Robert FARLA
Hamburg, 01.02.2021

HELMHOLTZ RESEARCH FOR GRAND CHALLENGES

DESY.

Introduction

Brief overview

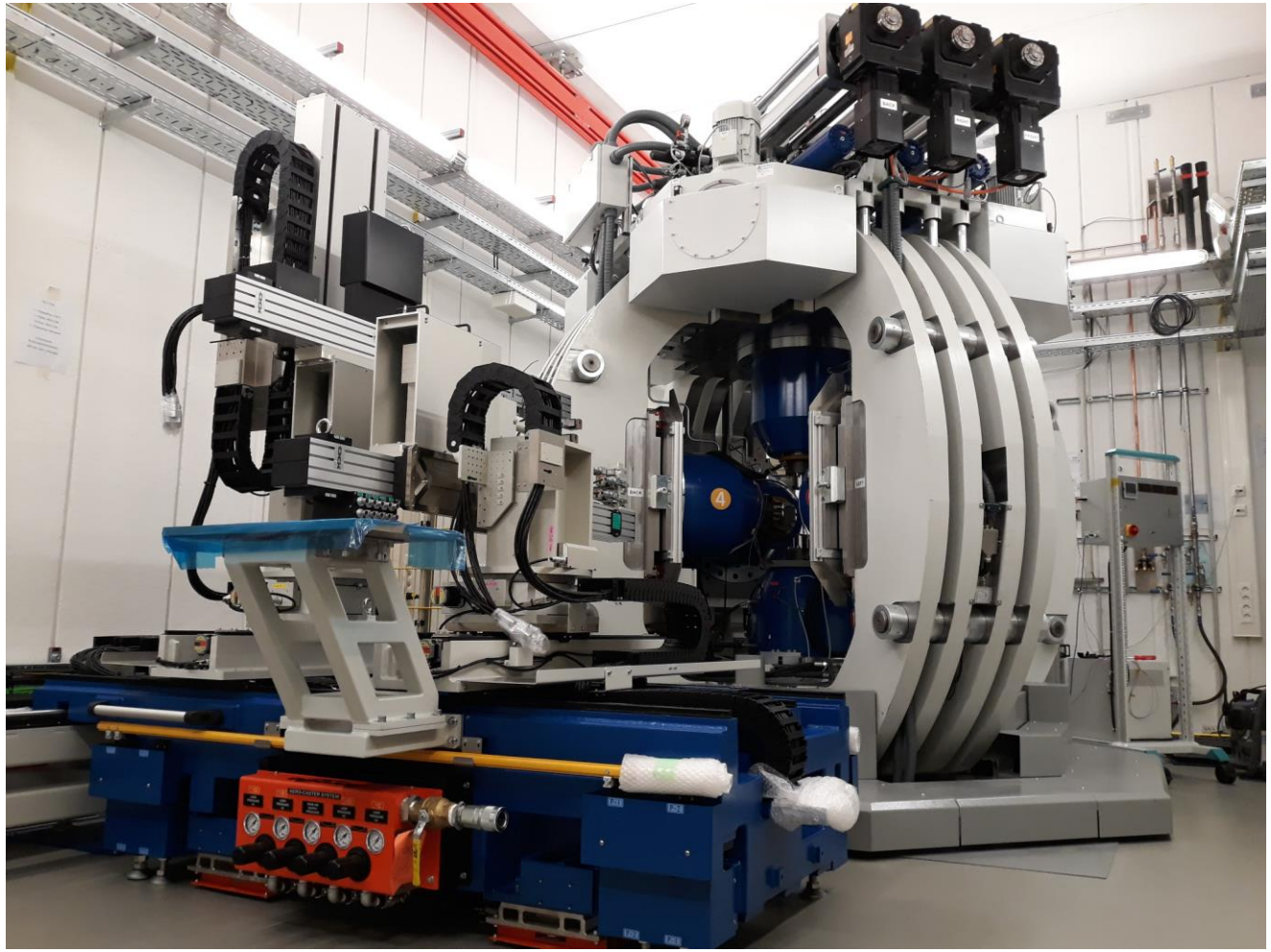
- ✓ **Beamline status**
- User operations & schedule
- Beamline development / installation

- ✓ **Beamline members & collabs**

- ✓ **PETRA IV status**
- Workshops
- Scientific Instrument Proposals

- ✓ **Workshop programme**

→ **Start of session #1**



New 2-detector positioning system, in commissioning

Beamline status

User operations

- [2020] Started in Aug. 2020 → v. successful!
- [2020] Skipped 2021-I call (due to COVID19)
- [Now] Joining 2021-II call (deadline 1 March 2021)
- [Now] Beam sharing 50% with HZG (P61A)
  - Periods of scheduled beam time and offline mode

Beam line development and installations

- COVID19 delayed installation of 2-detector system
  - Commissioning in March 2021
- Delayed testing crystal for concept monochromator. Detector already purchased.
  - March/April 2021 (?)

Offline use of LVP: schedule

→ **12 April 2021 until 04 May 2021**

→ **10 June 2021 until 06 July 2021**

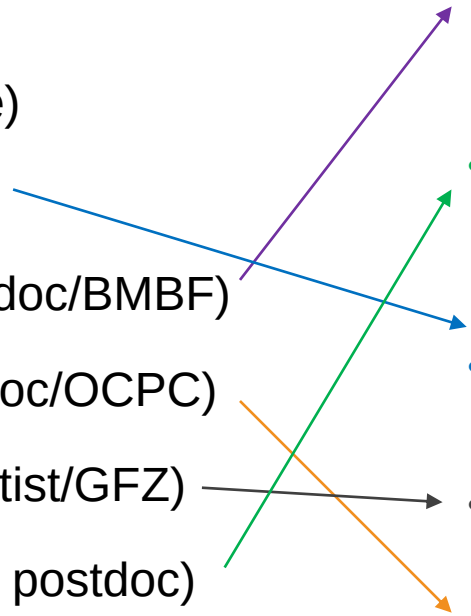
- Please consider submission of proposals to beamline staff / manager any time!
- Offline LVP proposals may be considered as LTP proposals (i.e. multiple visits).
- Can be mail-in proposals for standard synthesis of (novel) samples.

Beamline members and collabs

Members

- Robert Farla (BL responsible)
- Shrikant Bhat (BL scientist)
- Artem Chanyshev (BGI postdoc/BMBF)
- Shuailing Ma (Jilin Uni postdoc/OCPC)
- Christian Lathe (Guest scientist/GFZ)
- Kristina Spector (Leipzig Uni postdoc)

→ Equal division of expertise in Earth Sciences and Materials sciences (3+3)



Collaborations

- Ultra-high P and T generation in the 6-ram LVP & science applications (BMBF)
  - Prof. Katsura (BGI, Bayreuth)
- Exploration of ternary hydrides, applications such as H_2 storage and batteries, superconductivity (RAC/BMBF).
  - Prof. Häussermann (Stockholm) & Prof. Kohlmann (Leipzig)
- Exploration of binary and ternary nitrides
  - Prof. Riedel *et al.* (TU Darmstadt)
- Experimental investigation of the stability of DHMS (CMWS)
  - Monika Koch-Muller (GFZ Potsdam)
- Acoustic Emissions testing (crack location & charac.)
  - Julien Gasc (Montpellier)
- Ultrasonic interferometry (wave speed measurement)
  - Adrien Neri (BGI, Bayreuth)
- *In situ* Studies of Rock Deformation
  - Please contact me! :-)

PETRA IV status

PETRA IV workshops (Oct/Nov 2020)

Great attendance: 50 to 80 participants!

5 Proposals for LVP instrumentation submitted:

1. *In-situ* XRD & imaging at high pressure and temperature using the **6-ram LVP** at PETRA IV (PI: Dr. Sieber *et al.*)
2. Synthesis and characterization of novel materials by combination of **the large volume press** and high-density X-ray beams (PI: Prof. Katsura)
3. High-pressure-temperature deformation experiment using X-ray stress analysis and **6-ram LVP** (PI: Prof. Katsura)
4. Reliable investigation of **[ultra]** high P-T phase transitions by combination of *in situ* X-ray diffraction and advanced multi-anvil technique [**Uniaxial DIA-type press**] (PI: Prof. Katsura)
5. Dedicated LVPs for time-resolved, high-resolution, 3D, X-ray Imaging under Extreme Conditions at PETRA IV [using a **PE-type press**]. (PI: Dr. Sieber *et al.*)

Proposal review finalized → Next step: Concept Beamlines

Thank you all very much for supporting (the future of) the beamline!

Workshop programme

Offline use of LVP:

→12 April 2021 until 04 May 2021

→10 June 2021 until 06 July 2021

Enjoy the workshop!

PROGRAMME			
Session 1 – Geosciences			Chair: R. Farla
13:00 – 13:10	*Introduction*	R. Farla	DESY
13:10 – 13:35	*Recent results and future projects for high-pressure-temperature in situ X-ray diffraction experiments at beam line P61B (20 + 5 min)*	T. Katsura	BGI, Univ. of Bayreuth
13:35 – 14:00	*Probing element partitioning in situ at high P and T with EDX (20 + 5 min)*	C. Sanloup	Uni. Paris
14:00 – 14:25	*Determination of akimotoite-bridgmanite (MgSiO3) phase transition at 1250-2050 K using a multi-anvil press with in-situ X-ray diffraction: Explanation of the 660-km discontinuity depressions beneath cold subduction zones (20 + 5 min)*	A. Chanychev	BGI, Univ. of Bayreuth / DESY
14:25 – 14:40	*Coffee break (15 Min.)*		
Session 2 – Materials sciences			Chair: S. Bhat
14:40 – 15:05	*In-situ investigation of solid-gas/fluid reactions at gigapascal pressures using LVP beamlines (20 + 5 min)*	U. Häussermann	Uni. Stockholm
15:05 – 15:30	*Phosphorus Nitrides under Pressure - ex-situ and in-situ (20 + 5 min)*	S. Ambach	LM Uni. München
15:30 – 15:55	*Multi-phase XRD analysis of materials synthesized with the LVP at P61B (20 + 5 min)*	L. Wiehl	T. U. Darmstadt
15:55 – 16:10	*Coffee break (15 Min.)*		
Session 3 – Beamline review and discussion			Chair: S. Bhat
16:10 – 16:35	*Status and development of beamline P61B (20 + 5 min)*	R. Farla	DESY
16:35 – 17:00	*Discussions for PETRA III and IV, close-out (25 min)*		
17:00	*End of the workshop*		

Questions and Answers

End of workshop discussion

- Does the beamline provide you the resources you need?

- How can we make offline experiments more attractive? E.g. alternative in situ measurements:
  - Acoustic Emissions, Ultrasonic wave speed measurements, **Electrical Conductivity (impedance analyser)**

- **Polishing wheel (equipment) Nora**

Contact

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