



IUCr/DGK International Summer School
**Introduction to Novel Methods of Atomic
and Electronic Structure Studies at High Pressures**
August 31- September 4, 2020
Bayreuth, Germany



Scope

This school aims at providing an introduction to novel methods of atomic and electronic structure studies at high pressures in a diamond anvil cell to early career stage scientists (master and PhD students, post-docs) and scientists working in the field of high pressure research. The focus will be set on new developments in (1) high-pressure single crystal X-ray diffraction (SC-XRD) from polycrystalline samples and (2) high-pressure solid-state nuclear magnetic resonance (NMR). The recent advancements in the both techniques drastically extended their applications, previously mostly limited to tens of GPa, to multimegabar pressures and temperatures of thousands of degrees. An overview of the necessary fundamental theoretical and methodological principals, including diamond anvil cell preparation and strategy of experiments, will be covered through lectures accompanied by multiple demonstrations, hands-on sessions, and step-by-step tutorials. At the end of the school, participants are expected to be able to perform basic high pressure SC-XRD and NMR experiments, as well as data processing and interpretation. *The school is supported by the IUCr Commission on High Pressure (CHP) and the German Society for Crystallography (DGK).*

The maximum number of participants is 20. Selection of participants will be done based on consideration of applications and on a 'first come first served' basis.

The school will take place from 31.08.2020 to 04.09.2020 (arrivals and onsite registrations on 30.08.2020). These dates are in between the IUCr Congress (22-30 August 2020, Prague, Czech Republic) and the EHPRG Meeting (6-11 September 2020, Tenerife, Spain). Bayreuth is perfectly situated to combine this school with any of these events: it is at a couple of hours drive from Prague, and there is a direct flight to Tenerife from the nearby Nuremberg international airport.

Application form

<https://www.dubrovinskaia.uni-bayreuth.de/en/High-Pressure-Summer-School-2020/index.html>

Important dates

Application deadline: **31.03.2020**

Acceptance decision: **25.04.2020**

Arrivals and onsite registrations: **30.08.2020**

School dates: **31.08.2020-04.09.2020**

Organisers

- Dominique Laniel
- Thomas Meier
- Leonid Dubrovinsky
- Natalia Dubrovinskaia

Additional information:

Registration fee

- Students and post-docs: 70 €
- Academics: 300 €
- Industrials: 500 €

Contact

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Topics

Basics of Diamond Anvil Cell Research:

- Pressure generation in DACs
- Preparation of DACs—*hands-on*
- Pressure Determination
- Heating and cooling techniques—*hands-on*

Single-crystal X-ray diffraction from polycrystalline samples:

- Introduction to single crystal X-ray diffraction
- Technical requirements and single crystal X-ray diffraction data collection
- Single crystal data integration (CrysalisPro)—*hands-on*
- Structural solution and refinement (Jana2006)—*hands-on*

Nuclear Magnetic Resonance:

- Introduction to nuclear spin interactions
- Probes, spectrometers and magnets – *hands on*
- High pressure NMR techniques and simple experiments—*hands-on*

Teachers

- Dr. Dominique Laniel
- Dr. Thomas Meier
- Dr. Konstantin Glazyrin
- Dr. Sergey Ovsyannikov
- Prof. Dr. Leonid Dubrovinsky
- Prof. Dr. Natalia Dubrovinskaia

Invited lectures

Each afternoon invited lectures will be given by leading scientists in the field of high pressure research.