

High pressure: Making it, measuring it, and avoiding pitfalls

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In this talk I will give an introduction to basic aspects of high pressure techniques and metrology, understandable for participants from various backgrounds. For further reading refs. [1-3] may be useful. Principle keywords of my presentations are:

- Pressure and stress: Basic elements of elasticity theory. Uniaxial, shear and hydrostatic stress, Von-Mises stress.
- High pressure devices: From piston-cylinders to opposed-anvil cells. How strong is a cylinder? Pressure-volume trade-off.
- Measuring pressure: Basic elements of pressure determination from 1 bar to 1 Mbar, accuracy versus precision. Common pressure markers. The Decker and ruby scales.
- Hydrostaticity: Pressure transmitting fluids/media. Solid media: the “Lamé effect.
- Common pitfalls: A collection of reported “anomalies” due to non-hydrostatic or non-homogeneous pressure conditions.

I admit that this program might be challenging for a 45 minutes talk. I encourage the participants to have a double-expresso for breakfast to follow my talk till the end!

References

- [1] J.S Loveday (ed.) High-Pressure Physics, CRC Press/Taylor and Francis, 2012.
- [1] S. Klotz, Techniques in High Pressure Neutron Scattering, CRC Press/Taylor and Francis, 2013.
- [3] J.M. Recio, J.M. Menendez, A.O. de la Roza (edts.), An Introduction to High-Pressure Science and Technology, CRC Press/Taylor & Francis, 2016.