

12th Workshop on High Pressure, Planetary and Plasma Physics (12HP4) European XFEL, Schenefeld September 22-24, 2025	
Monday, September 22	
13:20	<u>Thomas Tschentscher</u> (European XFEL Schenefeld) Welcome
Session 1: Molecular Systems Chair: <i>Nadine Nettelmann</i>	
13:30	<u>Jean-Alexis Hernandez</u> (ESRF Grenoble) (invited) Investigating the phase diagram of highly compressible materials with laser-driven shock compression in diamond anvil cell
14:00	<u>Martin Preising</u> (University of Rostock) Temperature ionization of helium from ab initio simulations
14:20	<u>Katharina Mohrbach</u> (University of Münster and DESY Hamburg), <i>E. Edmund, K. Glazyrin, N. Satta, A. Mondal, M. Wendt, H.-P. Liermann, C. Sanchez Valle</i> Non-monotonic melting curve of methane (CH ₄) at planetary interior conditions
14:40	<u>Uwe Kleinschmidt</u> (University of Rostock) A conductivity model for hydrogen based on ab initio simulations
15:00	Coffee break
15:30	<u>Daisuke Murayama</u> (University of Osaka) (invited) Superionicity of C–H–O ternary system with ab initio molecular dynamics simulations
16:00	<u>Argha Roy</u> (University of Rostock), <i>A. Bergermann, M. Bethkenhagen, R. Redmer</i> Mixture of hydrogen and methane under planetary interior conditions
16:20	<u>Marina Cano Amoros</u> (DLR Berlin), <i>N. Tosi, S. Mazevet, N. Nettelmann</i> H ₂ -H ₂ O phase separation in Uranus and Neptune and revised entropies of the AQUA EOS
16:40	<u>Nicola Tosi</u> (DLR Berlin) Hydrogen-water demixing in ice-giant-like exoplanets
17:00	Poster Session (see pg. 5)

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Tuesday, September 23	
Session 2: Plasma and Warm Dense Matter Chair: <u>Thomas Tschentscher</u> (<i>European XFEL Schenefeld</i>)	
9:00	<u>Tilo Doeppner</u> (<i>Lawrence Livermore National Laboratory</i>) High energy density physics at the NIF: from planets to stars
9:20	<u>Thomas Gawne</u> (<i>CASUS, HZ Dresden-Rossendorf</i>) Spectral Deconvolution without the Deconvolution: Extracting temperature from X-ray Thomson scattering spectra without the source-and-instrument function
9:40	<u>Dmitrii Bepalov</u> (<i>European XFEL Schenefeld</i>) Experimental evidence for the breakdown of uniform electron gas models in warm dense Aluminium
10:00	<u>Moyassar Mohamed Meshhal</u> (<i>University of Rostock</i>), <i>R. Redmer, U. Zastra, D. Bepalov</i> Resolving warm dense Aluminum with first-principles and machine-learned MD simulations
10:20	<u>Zhandos Moldabekov</u> (<i>CASUS, HZ Dresden-Rossendorf</i>) Advancing time-dependent density functional theory for modeling the XRTS of plasma and warm dense matter
10:40	Coffee break
11:10	<u>Eric Edmund</u> (<i>University of Münster</i>) Structure and metallicity of dense liquid carbon at high pressures
11:40	<u>Dominik Kraus</u> (<i>University of Rostock</i>) Exploring the high-pressure phase diagram of carbon at European XFEL and the National Ignition Facility
12:10	<u>Johannes Rips</u> (<i>University of Rostock</i>) Investigating the onset of carbon K-shell ionization from imploding CH capsules measured at the National Ignition Facility
12:30	Lunch break

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Session 3: High pressure structures Chair: <i>Karen Appel (European XFEL Schenefeld)</i>	
14:00	<i>Rachel Husband (DESY Hamburg)</i> X-ray phase contrast imaging in the diamond anvil cell
14:30	<i>Christian Plückthun (DESY Hamburg)</i> The lattice parameter development of Zinc (Zn), during fast compression in the dDAC
14:50	<i>Georg Spiekermann (University of Münster)</i> How a 4-dimensional structural analysis of ab initio simulated silicate melt can reconcile model and experiment
15:10	<i>Lisa Randolph (University of Siegen)</i> Grazing-incidence X-ray probing of ultrafast surface and subsurface dynamics for high-energy-density science
15:30	Coffee break
16:00	<i>Celine Crepisson (University of Oxford)</i> Study of iron oxides in amorphous and molten phases under laser-driven shock compression at Earth's outer-core pressure conditions
16:30	<i>Carolina Camarda (European XFEL Schenefeld)</i> Spin state and density evolution of ferropericlase under Earth's core-mantle boundary conditions
16:50	<i>Florian Trybel (Linköping University)</i> Towards predicting complex planetary and functional materials: Symmetry and vectorisation as an efficient tool for configuration space navigation
17:10	<i>Rick ten Eikelder (Linköping University)</i> Finite-T high-P variable cell structural relaxations utilizing the temperature dependent effective potential (TDEP) method
Conference Dinner	

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Wednesday, September 24	
Session 4: Earth and Planetary Structures Chair: <i>Georg Spiekermann (University of Münster)</i>	
9:00	<u>Jie Deng (Princeton University)</u> Simulating Earth and planetary processes with large-scale atomistic simulations powered by machine learning potentials
9:30	<u>Maximilian Schulze (University of Bayreuth), G. Steinle-Neumann</u> Oxygen diffusivity in davemaoite and its geophysical and geochemical implications
9:50	<u>Kilian Abraham (University of Rostock), G. Steinle-Neumann, R. Redmer</u> Equation of state and transport properties of iron hydrides at outer core conditions via ab-initio and machine learning methods
10:10	<u>Valentin Bonnet Gibet (DLR Berlin)</u> Thermal conductivity control on magnetic field generation in planetary cores
10:30	Coffee break
11:00	<u>Attilio Rivoldini (Royal Observatory of Belgium)</u> Effect of Mercury's interior structure on its long-period libration
11:20	<u>Anna Julia Poser (Freie Universität Berlin)</u> Rapid interior characterization of exoplanets for the PLATO era
11:40	<u>Ying-Jui Hsu (RWTH Aachen)</u> Oxidation state of La Reunion Island basalts 2007 eruption: observations from sulfur X-ray absorption micro-spectroscopy
12:00	<u>Gerd Steinle-Neumann (University of Bayreuth)</u> Summary and farewell

Poster list	
1.	<u>Karen Appel</u> (<i>European XFEL Schenefeld</i>) Structural properties of SiO ₂ and ferropericlasite at in-situ conditions within Earth and rocky planets
2.	<u>Thomas Chuna</u> (<i>CASUS, HZ Dresden-Rossendorf</i>) Estimates of the dynamic structure factor for the finite temperature electron liquid via analytic continuation of path integral Monte Carlo data
3.	<u>Gerd Steinle-Neumann</u> (<i>University of Bayreuth</i>), <i>L. Yuan</i> Earth's "missing" chlorine may be in the core