

Dynamically Compressed Matter with X-rays

12 March to 14 March 2024



Tuesday 12 March – ESRF Auditorium



STREAMLINE

from 11:30 Registration in the ESRF Central Building Entrance Hall		
14:00	Welcome: R. Torchio and M. Mezouar	
Session I: Dynamic compression at the ESRF - Chair: O. Mathon		
14:15	Status and first results from the High Power Laser Facility	J-A. Hernandez ESRF, France
14:40	Experimental platforms for dynamic studies with MHz X-ray radioscopy at ID19 of ESRF	B. Lukic ESRF, France
15:05	Development of a laser-driven shock compression platform at the ID09 beamline of the European Synchrotron Radiation Facility	A. Sollier CEA, Arpajon, France
15:30	Coffee break	
Session II: Matter under high strain rate - Chair: S. Bland		
15:50	XPCI Observations of Dynamic Compressive Fracture of Fiber Reinforced Polymer Composites and Granite Rocks	M. Hokka Tampere University, Finland
16:20	Pores collapse and spall fracture: a direct observation using fast ultra-high speed X-ray Phase Contrast Imaging	T. Virazels University Carlos III of Madrid, Spain
16:40	Dynamic compaction under shock loading experiments using ultra-high speed X-ray radiography	M. Arrigoni ENSTA Bretagne, France
17:00	Probing the evolution of solid microjets from grooved Sn samples and their impact on Asay foil and piezoelectric mass diagnostics using X-ray radiography.	J.-R. Burie CEA Arpajon, France
Session III: Sponsor		
17:20	High Power Nanosecond Laser for Dynamic Shock Compression and roadmap to high peak power laser at high repetition rate	O. Zabiolle Sponsor: Amplitude, France
17:40	Break	
18:00	Beamline visits - meeting point ESRF entrance hall	
18:30	Poster session & Wine and cheese on the ESRF mezzanine	

Wednesday 13 March – ESRF Auditorium

Session IV: Phase diagrams and Warm Dense Matter - Chair: D. Kraus		
8:30	X-ray absorption spectroscopy of dynamically compressed matter	A. Krygier LLNL, USA
9:00	Ultrafast X-ray Absorption Spectroscopy on Fe and Cu up to shock melting collected at HPLF (ESRF)	S. Balugani ESRF, France
9:20	X-ray diffraction measurements across the melt line in shocked nickel	K.A. Pereira University of Massachusetts, USA
9:40	Femtosecond structural probing of warm dense matter with Betatron laser-based X-ray source	F. Dorchies Univ. Bordeaux, CNRS, CEA, CELIA, France
10:00	A pulsed power facility for studying the warm dense matter regime	B. Jodar CEA, DAM, France
10:20	Coffee break & Group Photo	
Session V: Dynamic compression for Planetary Science - Chair: S. Scandolo		
10:50	Exploring the deep interior of ice giant planets with density functional theory and shock-compression experiments	M. Bethkenhagen LULI, Ecole Polytechnique, France
11:20	Combining ultrafast X-ray spectroscopy and diffraction to investigate deep planetary interior conditions	S. Pandolfi Sorbonne Université, France
11:50	Time-resolved X-ray absorption spectroscopy of shocked magnesiosiderite: possible implications for the origin of magnetite in Martian meteorite ALH84001	A.P. Dwivedi European XFEL, Germany
12:10	Phase transitions and electronic properties of Fe ₂ O ₃ under laser compression by ultrafast in-situ X-ray absorption spectroscopy	J. Pintor IMPIC, Sorbonne University, France
12:30	Lunch	
13:40	Beamlines visits - meeting point ESRF entrance hall	
14:30	Roundtable & Coffee	
Session VI: New instrumental opportunities - Chair: T. Vinci		
16:25	The HED instrument at European XFEL: Unique capabilities to study material properties of laser-compressed matter First results obtained using the DiPOLE laser at the European XFEL	E. Brambrink European XFEL, Germany M. McMahon University of Edinburgh, UK
17:10	Towards the direct measurement of bulk temperature in shock-compressed matter using inelastic X-ray scattering at an XFEL	A. Descamps Queen's University Belfast, UK
17:40	Single pulse extended x-ray absorption fine structure capability at the Dynamic Compression Sector - Video presentation	P. Das Washington State University, USA
18:25	Beamline visits - meeting point ESRF entrance hall	
19:30	<i>Bus departure to Dinner at the restaurant in front of the epn campus site entrance</i>	

Thursday, 14 March – ESRF

Session VII: Matter under high strain rates - Chair: A. Rack		
9:00	Ductile failure in metals: How does void growth rate depend on loading rate?	G. C. Ganzenmüller, Albert-Ludwigs Universität Freiburg, Germany
9:20	Dynamic Shear Localization and Vortical Flow during Shock Wave Induced Pore Collapse in Sucrose	S. Neogi Brown University, USA
9:40	A new approach for shockwave experiments in arbitrary geometries: pulsed power driven exploding wires and foils	J. Strucka Imperial College London, UK
10:00	Measuring material strength in laser compressed Ta via in situ X- ray diffraction at the Dynamic Compression Sector	D. McGonegle AWE, UK
10:20	Coffee break	
Session VIII: Phase transitions, phase diagrams - Chair: M. Levantino		
10:40	Phase transitions in amorphous materials under shock compression	I. Oleynik University of South Florida, USA
11:10	Macroscopic and microscopic study of Glassy GeO ₂	A. Benuzzi LULI, Ecole Polytechnique, France
11:30	Dynamic behaviour of zirconium-based metallic glasses under laser shock compression	Y. Raffray Institute of Physics Rennes, UMR CNRS, France
11:50	Studies of Dynamically Compressed Methane-Hydrogen with Raman Spectroscopy	J. Yan University of Edinburgh, U.K.
12:10	Conclusion	
12:30	Lunch	
13:40	Beamline visits - meeting point ESRF entrance hall	
14:30 – 17:30	Instrumental Training Session	