

# EMMI Workshop on High Energy Density Plasma Diagnostics at FAIR September 30. – October 02. 2013 at GSI Darmstadt

**Monday, 30.09.2013**

**Registration / Opening / Oral Talks / Photo / Reception at GSI**

**Registration: 8.30 – 9.15 (Seitenraum Hörsaal SB1 1.201)**

**9.20 – 9.40**      **Opening: Olga Rosmej, Boris Sharkov** *GSI and FAIR Darmstadt (BofA 42)*  
FAIR and prospects of High Energy Density Physics

## **9.40 – 11.10**      **Plasma Physics with Intense Heavy Ion and Laser Beams at FAIR**

**09.40 – 10.10**      **Dmitry Varentsov** *GSI Darmstadt (BofA 46 /Book of Abstracts page 46)*  
High energy density experiments with intense heavy ion and proton beams at FAIR.

**10.10 – 10.40**      **Vincent Bagnoud** *GSI Darmstadt (BofA 7)*  
Status of the Helmholtz Beamline at FAIR and PHELIX-laser.

**10.40 – 11.10**      **Thomas Kuehl** *GSI Darmstadt (BofA 29)*  
X-ray laser for FAIR.

**Coffee Break (1): 11.10 – 11.30**

## **11.35 – 12.55**      **Experimental Projects at FAIR**

**11.35 – 11.55**      **Anna Tauschwitz** *ITP, Goethe University Frankfurt and EMMI (BofA 44)*  
Experimental investigation of two-phase metastable states at FAIR:  
Need for laser-driven diagnostics.

**11.55 – 12.15**      **Artem Korzhimanov** *Institute of Applied Physics RAS, Moscow (BofA 27)*  
Petawatt-class laser accelerated high energy mid-Z ions for nuclear physics.

**12.15 – 12.35**      **Simon Busold** *TU-Darmstadt (BofA 9)*  
Results of the first experiments with the completed LIGHT beamline at GSI.

**12.35 – 12.55**      **Christian Spielmann** *Inst. für Optik und Quantenelektronik, Univ.Jena (BofA 43)*  
X-ray sources for experiments at the High Energy Storage Ring HESR.

**Lunch + Photo: 13.00 – 14.30**

## **14.30 – 16.10**      **Physics with High Contrast / Ultra-short Laser Pulses**

**14.30 – 15.00**      **Laszlo Veisz** *Max-Planck-Institut für Quantenoptik, Garching (BofA 48)*  
Generation and applications of relativistic quasi-single-cycle laser pulses.

- 15.00 – 15.30**     **Hartmut Ruhl** *Computational Physics Munich (BofA39)*  
Circular Attosecond Pulses from Nano Foils.
- 15.30 – 15.50**     **John Farmer** *Uni Düsseldorf (BofA 17)*  
Simulations of Raman amplification in Plasma.
- 15.50 – 16.10**     **Graeme Scott** *Central Laser Facility STFC/University of Strathclyde Chilton (BofA 41)*  
Plasma mirror lifetime characterisation and its applications to laser plasma interactions.

**Coffee Break (2): 16.10 – 16.30**

### **16.30 – 18.00    Laser Induced Fields in Plasmas and WDM Properties**

- 16.30 – 17.00**     **Matt Zepf** *Queen's University Belfast UK and Helmholtz.Inst.Jena (BofA 51)*  
Picosecond response of materials to ultrafast ion bursts.
- 17.00 – 17.20**     **Anupam Karmakar** *Leibniz Supercomputing Centre Garching (BofA 25)*  
From MegaGauss to GigaGauss - high magnetic field generation by laser pulses at relativistic intensities.
- 17.20 – 17.50**     **Florian Abicht** *Max-Born-Institut Berlin (BofA 6)*  
Coaction of strong electrical fields in laser irradiated thin foils and its relation to field dynamics at the plasma-vacuum interface.
- 17.50 – 18.10**     **Paul Neumayer** *ExtreMe Matter Institute EMMI Darmstadt (BofA 35)*  
High-energy density matter experiments with the PHELIX laser.

**Reception (Gästehaus, GSI): 18.30 – 20.30**

## **Tuesday, 01.10.2013      Oral talks / Poster Session / Dinner in Darmstadt City**

Beginning 9.15

### **9.20 – 10.50    Nuclear Physics and Particle Acceleration with Lasers**

- 09.20 – 9.50**     **Sydney Gales** *ELI-NP / IFIN-HH Magurele-Bucarest (BofA 18)*  
Nuclear Science and Applications with next generation of High Power Lasers and Brilliant Low Energy Gamma Beams at ELI-NP.
- 09.50 – 10.10**     **Sergey Romashevskiy** *JIHT RAS Moscow (BofA 38)*  
Registration technique of  $^{57}\text{Fe}$  isotope nucleus emission generated by femtosecond laser pulses.
- 10.10 – 10.30**     **David Denis-Petit** *CENBG Gradignan France (BofA 10)*  
Nucleus-electronic cloud coupling in plasma: the case of  $^{84}\text{Rb}$ .
- 10.30 – 10.50**     **Sergey Bochkarev** *P.N. Lebedev Physics Institute Moscow (BofA 8)*  
Electron acceleration in the regime of stochastic heating with a ps-laser pulse.

**Coffee Break (3): 10.50 – 11.10**

## 11.15 – 12.55 Particle Acceleration at Ultra-relativistic Intensities

- 11.15 – 11.45 **Alexander Pukhov** *Uni Duesseldorf (BofA 38)*  
Particle acceleration by ultra-intense laser pulses including QED effects.
- 11.45 – 12.15 **Jingyi Mao** *TU Kaiserslautern (BofA 33)*  
Femtosecond laser-driven X-ray sources and target surface electron acceleration.
- 12.15 – 12.35 **Liangliang Ji** *Institut für Theoretische Physik I, University of Duesseldorf (BofA 24)*  
Energy conversion channel and gamma-photon emission in the near-QED regime of laser-plasma interaction.
- 12.35 – 12.5 **Laura Di Lucchio** *Forschungszentrum Juelich (BofA 15)*  
Interaction of few-cycle laser pulses with nano droplets.

**Lunch: 13.00 – 14.30**

## 14.30 – 16.10 Particle Acceleration from Structured Targets

- 14.30 – 15.00 **Andrey Savel'ev** *Lomonosov Moscow State University Moscow (BofA 40)*  
Impact of a pre-pulse onto relativistic laser plasma interaction: electron, proton and heavy ion acceleration and surface structuring.
- 15.00 – 15.30 **Jiri Limpouch** *Czech Technical University, Prague (BofA 30)*  
Laser-induced ion acceleration - towards higher ion energies.
- 15.30 – 15.50 **Wenjun Ma** *Dept. of Physics, Ludwig-Maximilians University Garching (BofA 32)*  
Novel particle and radiation sources enabled by nanotechnology and nanomaterials.
- 15.50 – 16.10 **Ilhan Engin** *Forschungszentrum Jülich (BofA 16)*  
Hydrogen cluster-gas mixtures as novel target concept for laser-acceleration experiments.

**Coffee Break (4)**

16.15 – 17.45 **Poster Session (BofA 54-80)**

**Dinner in Darmstadt + walking to Mathildenhöhe: 19.00 – 22.00**

**Wednesday, 02.10.2013**

**Oral talks / PHELIX / Departure**

Beginning 9.15

## 9.20 – 10.40 Laser Based Gamma-Sources and Gamma-Optics

- 09.20 – 9.40 **Lucy Wilson** *Central Laser Facility, STFC Didcot UK (BofA 50)*  
Laser generated gamma ray source optimisation for imaging applications.

- 09.40 – 10.00** **Vitaliy Trofimov** *Prokhorov General Physics Institute of the RAS Moscow (BofA 45)*  
Formation of Compressed High-Energy Electron Bunches by Interfering Laser Pulses with Tilted Fronts and their Application for Generation of Gamma-Rays.
- 10.00 – 10.20** **Marc Günther** *GSI Darmstadt (BofA 20)*  
Gamma optics in terms of optimization and characterization of novel coherent, high brilliant gamma ray sources and development of future imaging diagnostics.
- 10.20 – 10.40** **Yiling Cheng** *Institute of Physics, Univ. Rostock*  
Plasma diagnostics applying K-line emission profiles of mid-Z materials

**Coffee Break (5): 10.45 – 11.05**

## **11.10 – 12.40 Properties of Accelerated Protons and Applications**

- 11.10 – 11.40** **Ingo Hofmann** *GSI Darmstadt, HI Jena (BofA 22)*  
Laser accelerated protons - a candidate for WDM imaging @ FAIR.
- 11.40 – 12.00** **Astrid Holler** *Forschungszentrum Jülich (BofA 23)*  
Polarized ion beams generated by means of laser-induced relativistic plasmas.
- 12.00 – 12.20** **Oliver Deppert** *Institut für Kernphysik / Plasmaphysik, TU Darmstadt (BofA 12)*  
Laser-accelerated ions in the break-out-after regime - simulations, applications and diagnostics.
- 12.20 – 12.40** **Laura Vassura** *LULI, CNRS, CEA, UPMC, Palaiseau and Università di Roma (BofA47)*  
Narrow band neutron sources produced by ultra intense laser.

**Lunch: 13.00 – 14.30**

## **14.30 – 16.00 Fusion Relevant Applications**

- 14.30 – 15.00** **Claude Deutsch** *LPGP Univ. Paris-Sud, Orsay (BofA 14)*  
Pion stopping and meso-molecules formation in ultra-dense plasmas of FIS concern.
- 15.00 – 15.20** **Konstantin Khishchenko** *Joint Institute for High Temperatures Moscow (BofA 26)*  
Hydrodynamic simulation of thermonuclear burn wave processes in DT fuel under intense laser irradiation.
- 15.20 – 15.40** **Alexander Green** *Queen's University Belfast, UK (BofA 19)*  
Observation of beamed neutrons employing high power laser driven ions in a beam-fusion scenario.
- 15.40 – 16.00** **Igor Lomonosov** *Institute of Problems of Plasma Chemistry Chernogolovka (BofA 31)*  
Laser-driven shock waves and equation-of-state of matter.
- 16.00** **Workshop Summary**
- 16.15** **Visiting of the PHELIX-laser, Departure**