



High energy density science at ITEP (NRC "Kurchatov Institute")



TRINITI
ROSATOM



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Full scale numerical simulation:

- Monte-Carlo with Geant4 code (proton radiography, experiments with x-ray diagnostics, laser acc. electrons)
- Monte-Carlo of X-Ray Grazing-incidence spectrometers
- Monte-Carlo with FLUKA code
- COSY infinity – ion beam dynamic calculation
- CST Studio – charge particle diagnostic devices, ion optic. el.
- 2D3V PICSIS code for plasma simulation

Diagnostics:

- Proton radiography: PRIOR at FAIR
- Charge particle diagnostic of pulsed plasma (high power Z-pinch and lasers)
- X-Ray Grating Spectroscopy
- XCOT (Xray Conversion to Optical radiation and Transport) – in collaboration with GSI and GU-Frankfurt
- VISAR interferometry for experiments with shock wave
- Plasma diagnostic with laser interferometry and optical spectroscopy
- TOF heavy ions energy loss measurements in plasma

In collaboration with:

GSI/FAIR
(Darmstadt)
Rosmej O.,
Varentsov D.,
Zaaher S.,
Gyrdymov M....

IPCP
(Chernogolovka)
Lomonosov I.,
Mintsev V.,
Shilkin N.,
Nikolaev D.,
Dudin S.....

TRINITI
(Troitsk)
Grabovski E.,
Gritsuk A.

Laboratory of High energy density in matter physics

Golubev A., Kantsyrev A.,
Skobliakov A., Gavrilin R.,
Bogdanov A., Panyushkin V.,
Khurchiev A., Kolesnikov D.,
Savin S., Roudskoy I.,
Visotskiy S., Drozdovski A.,
Panyushkina A.,

Experimental data processing:

- Image processing for proton radiography
- X-Ray spectrum reconstruction for Z-pinch experiments (Angara)
- Tomography reconstruction (ART)
- RF signals analysis for ion energy loss in plasma experiments

Development of scientific devices and targets:

- Quadrupole lenses on Permanent Magnets (PM)
- Charge particle spectrometers on PM
- Plasma target on gas discharge
- High cur. electron beam gun (up to 300 keV)

Experience in experimental work:

- High energy proton radiography incl. expl. exp.
- X-Ray and particle diagnostic at Z-pinch setup (Angara at TROITSK (Russia))
- Participation in experiments at PHELIX laser – electron acceleration experiments
- Heavy ions energy loss measurements at TIPr (ITEP), UNILAC and SIS-18

Data acquisition system:

- Complex system for PRIOR at HHT (GSI)
- Synchronization units
- CCD cameras (PCO Edge 5.5, ..)
- Robots (target manipulator)
- High voltage generators and plasma target
- Software for complex system

