FIRST EXPERIMENTS ON LASER RADIOGRAPHY FACILITY, BASED ON 100 TW PICOSECOND LASER AND LIGHT-GAS GUN

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First experiments on laser radiography facility (LRF) based on 100 TW picosecond laser (Nd: glass, CPA, 80 J, 0.7÷1 ps) and light-gas gun were carried out. LRF will allow to perform hydrodynamic tests accompanied by radiography with high spatial (<0.1 mm) and temporal (<0.1 ns) resolution imaging.

In the experiments, samples shocked by the light-gas gun impactor were irradiated at various moments in time with bursts of bremsstrahlung radiation, which were generated by interaction of ultrashort high-intensity ($\geq 10^{19}$ W/cm^2) laser pulses with W target of 2 mm thickness.

As a result of shock-wave experiments, radiographic images of the evolution of spallation fracture in steel disk (∅52 mm) samples were obtained during a time interval of up to 6 μs after impact.

Additionally, a set of diagnostics was developed, enabling the measurement of spectral and angular characteristics of bremsstrahlung radiation during hydrodynamic tests.

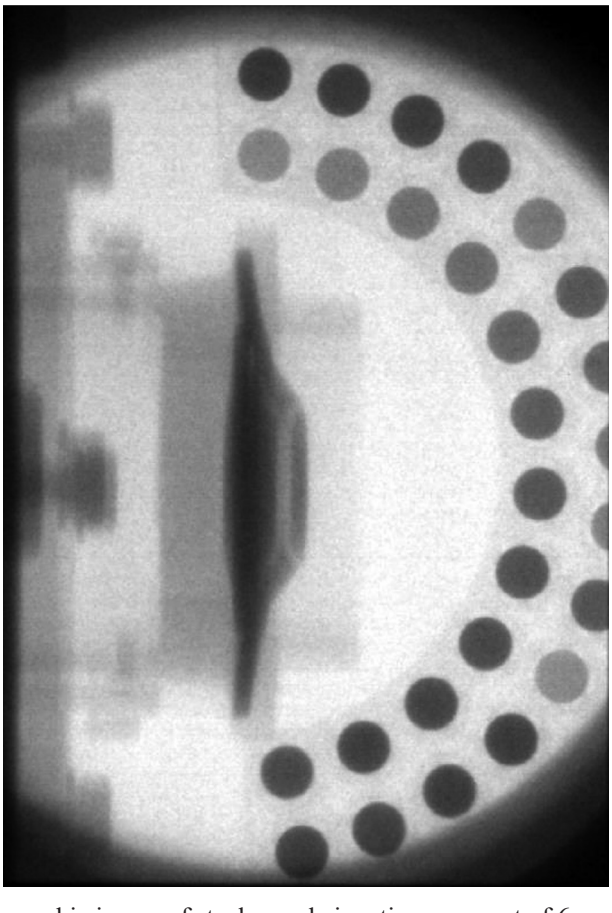

Fig 1. Radiographic image of steel sample in a time moment of 6 μs after impact