X-RAY radiation in solid-density PW LASER PLASMA – GENERATION, TRANSPORT AND APPLICATION TO STUDY RADIATION DOMINATED AND WARM DENSE MATTER [[1]](#footnote-1)\*)

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1,2S.A. Pikuz

1Joint Institute for High Temperatures RAS, Moscow, Russia, [spikuz@gmail.com](mailto:spikuz@gmail.com)  
2National Research Nuclear University ”MEPhI”, Moscow, Russia

In experiments with pico- and femtosecond optical laser pulses of relativistic intensities exceeding 1021 W/cm2 the laser energy is efficiently converted to X-ray radiation, which is emitted by hot electron component in collisionless processes. In turn, the intense X-ray radiation effectively ionizes the matter inside out, providing a large population of exotic states called hollow ions, and opens the way to study the matter in Radiation Dominated Regime. As well, together with fast electron flow, the radiation heats up the vicinity of the focal spot and deep-lying layers of the target to Warm Dense Matter states.

In this context, the following recent experimental studies on intense X-ray generation and consecutive phenomena in relativistic laser plasma of solid targets are overviewed:

- Non-linear growth of X-ray yield while optical field intensity ranges from 1e19 to 1e22 W/cm2,

- Spectroscopy studies on X-ray emission from deeply-charged high-Z ions;

- Observation of KK-hollow and high-n-hollow atoms, and the matter in Radiation Dominated Kinetics Regime;

- Emission and absorption spectroscopy measurements on the parameters of Warm Dense Matter isochorically heated by laser generated relativistic electrons.

- Radiation transport properties and solid-density effects in warm and hot dense laser plasma.

1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVII/R/en/LP-Molodozhentsev_e.docx) [↑](#footnote-ref-1)