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Laser-driven X-ray sources for investigating extreme states of matter generated by intense heavy ion beams

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One of the unique features of the infrastructure and facilities at GSI is the possibility to carry out experiments combining the heavy-ion beam of the accelerator with the high-power laser PHELIX. With the new beamline guiding the long-pulse (nanosecond) beam of PHELIX to the HHT experimental cave, which is currently being installed at GSI, new diagnostic methods for the investigation of heavy-ion heated states of matter will become available in the near future. These include using laser-driven X-rays for diffraction, imaging or spectroscopy for investigating the behavior of matter under such conditions. After a brief report on the status of the beamline we will discuss our plans for first experiments using the new capabilities at HHT. We have also performed a preliminary study into characterizing the laser-driven X-ray source in order to experimentally confirm the feasibility of our plans, which we will also present here.

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