

# Towards opacity measurements at the LMJ facility: preliminary experiments with the atomic physics platform

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The new High Resolution X-ray Spectrometer (HRXS) of the Laser Mega Joule facility (LMJ) was commissioned at the end of 2023. Combined with the broadband X-ray spectrometers DMX and mini-DMX and with X-ray imaging diagnostics [1], it constitutes a platform for atomic physics experiments at LMJ. In particular, we are interested in opacity measurements, for which the control of the sample hydrodynamics and the quality of the transmission measurement are cornerstones [2]. We plan to measure the transmission of a copper plasma, generated in a laser-heated baffle Hohlraum. The center channels of HRXS provide time resolution, and spatial resolution along one axis. The time resolution should suppress the background signal, while we can use the spatial resolution to select the signal transmitted by the Cu plasma on the one hand and the signal that propagated through a witness area on the other hand. Following the HRXS commissioning, we performed preliminary experiments with HRXS, testing separately different backlighters and the Hohlraum, in order to assess the accessible quality of the transmission measurement and the sample preparation.

## References

[1] W. Cayzac *et al.*, High Energy Density Phys. **52**, 101125 (2024).

[2] Heeter R. et al, Milestone 7720: National Opacity Program - Tri-Lab Assessment of Measurements and Models. No LLNL-TR-858890, Lawrence Livermore National Laboratory (LLNL), Livermore, CA (United States) (2023).

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