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Presence and future of X-ray scattering techniques for the understanding of ultra-short pulse laser matter interactions THOMAS KLUGE, MELANIE RDEL, LENNART GAUS, MICHAEL BUSSMANN, Helmholtz-Zentrum Dresden-Rossendorf, ERIC GALTIER, SLAC, ALEJANDRO LASO GARCIA, Helmholtz-Zentrum Dresden-Rossendorf, SIEGFRIED GLENZER, SLAC, CHRISTIAN GUTT, Universitt Siegen, HAE JA LEE, SLAC, JOSEFINE METZKES-NG, Helmholtz-Zentrum Dresden-Rossendorf, BOB NAGLER, SLAC, MOTOAKI NAKATSUTSUMI, European XFEL, MASATO OTA, Osaka University, ALEXANDER PELKA, IRENE PRENCIPE, Helmholtz-Zentrum Dresden-Rossendorf, LISA RANDOLPH, Universitt Siegen, MARTIN REHWALD, Helmholtz-Zentrum Dresden-Rossendorf, YOUICHI SAKAWA, Osaka University, HANS-PETER SCHLENVOIGT, Helmholtz-Zentrum Dresden-Rossendorf, THOMAS E. COWAN, ULRICH SCHRAMM, Helmholtz-Zentrum Dresden-Rossendorf/ TU Dresden — The development of next generation laser plasma sources for novel applications ranging from astro-physics, fusion research to particle acceleration and tumor therapy requires methods to study the dynamics and heating of dense plasmas on nanometer and femtosecond scales simultaneously. FELs are identified as a new tool to achieve this goal since they combine short bunches, high photon numbers with small bandwidth and high penetration power. We review our recent advances in theory and experiments for transferring scattering techniques into the short-pulse laser domain. Besides the future potentials of the small angle scattering technique we will focus on the possible impact of resonant scattering for opacity measurements.

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