

# Spectrally-Resolved Spatial Interference for Single-Shot Temporal Metrology of Ultrashort X-Ray Pulses

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**Abstract:** *So far, plasma-based soft X-ray lasers seeded by high harmonics have only been temporally characterized using streak cameras, with a 1-ps temporal resolution. However, theoretical and experimental studies showed that sub-ps seeded soft X-ray lasers are achievable. Existing methods do not provide enough information or require multiple shots, needing stable sources. In this work, we theoretically propose a single-shot method to characterize ultrashort soft X-ray pulses, based on spectrally-resolved spatial interference between an unknown pulse and a reference high-harmonic pulse. High harmonics have already been characterized, providing enough information to extract the unknown spectral phase from the 2D interferogram.*