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ABSTRACT	
Title of the presentation	Numerical Study Of Spectron Phase Peculiarities
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MODE OF PARTICIPATION		
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TOPIC		
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		Quantum information
		Optical properties of nanostructures and scintillating materials

Numerical Study of the Spectron Phase Peculiarities

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The spectron pulse, which images its spectrum, is a one shaped in the "far zone of dispersion" in the temporal analogy of Fraunhofer diffraction [1-3]. The spectron shaping process, known in its applications as dispersive Fourier transformation [4,5] or real-time Fourier transformation [6,7], is a unique measurement technique that overcomes the speed limitations of traditional optical instruments and enables fast continuous single-shot measurements in optical sensing, spectroscopy and imaging. Dispersive Fourier transformation, due to chromatic dispersion, maps the spectrum of an optical pulse to a temporal waveform whose intensity records the spectrum, thus allowing a single-pixel photo-detector to capture the spectrum at a scan rate significantly beyond what is possible with conventional space-domain spectrometers.

The objective of our research is the study of spectron phase peculiarities. The general question is if the dispersive Fourier transformation works for the phase also, i.e. if the phase of specton pulse images the spectral phase, and under what conditions. In our numerical experiments, we first studied the spectron shaping from the two-peak pulses with various amplitudes and time shifts. Afterwards, we studied the process for pulses with the sine-cosine type initial spectral phases, with various amplitudes and frequencies. We have found the optimal conditions under which the phase of spectron images the spectral phase. Our research has shown that for two-peak pulses the requested dispersion for the phase-imaging is the same as for amplitude. In the second case, the phase-imaging requests less dispersion than for the amplitude.

The results of our studies can be prospective for a pulse spectral phase temporal imaging and measurement [8], and for the femtosecond pulse complete characterization, alternatively to spectral interferometry [9].

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