Expansion of the operating spectral range of the optical processor(Conference Paper)

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Просмотр дополнительных организаций

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This article researches the proposed physical and mathematical model of a digital coherent optical spectrum analyzer, the spatial spectral bandwidth of which is limited by the diffraction of light on the matrix structure of the modulator. To expand the bandwidth of the spectrum analyzer, proposed to illuminate the modulator with a plane wave that incident on the modulator at a certain angle, similarly to the Leit-Upatnieks hologram. The research of the model has shown that when the modulator is illuminated with an inclined plane wave, the form of the diffraction pattern does not change, but the whole picture is shifted. To expand the operating spectral range (bandwidth), it is necessary that two diffraction maximum of the 0-th and + 1st orders incident into the entrance pupil of a Fourier lens, and when they are recorded, the entire sensitive surface of the matrix radiation detector is fully used. In this case, the operating range of the spectrum analyzer is equal to twice the Nyquist frequency of the modulator. © 2019 SPIE.