

Tymchik G.S., NguyenQ.A., Kolobrodov V.G. The boundary characteristics of a coherent optical spectrum analyzer

The influence of the component dimensions and parameters of a coherent optical spectrum analyzer on its performance was studied. One of the criteria for evaluating the performance of this instrument are the spatial resolution and the spatial bandwidth product. The purpose of this article is to study the dependence of the limiting characteristics on the changing of the component parameters of the coherent spectrum analyzer. It was considered, that the influence of the Fourier lens aberrations and the geometric dimensions of the CCD sensor on the spectral resolution and spatial bandwidth product in the schema of the analyzer, where the input transparency is located at the front focal plane of the Fourier lens. As the input transparency we used a circular aperture. The expressions, that show the dependence of the limiting characteristics on the size of the system components, were obtained in the case of using matrix sensor of a large resolution. The following example shows that the large size of the sensor allows obtaining the high spatial resolution and the large spatial bandwidth product of the device.

Keywords: coherent spectrum analyzer, spatial resolution, spatial bandwidth product, point spread function.

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