

Three-dimensional kogerentization

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The paper shows that any point source of light at the observation point gives coherent radiation.

With the aid of the phased antenna arrays it is possible to create the pencil beams of electromagnetic waves. The process of the formation of such beams is connected with the addition in the space spatially coherent waves. Addition (interference) is accomplished in such a way that in the determinate directions the phases of waves from the separate emitters are added, and in others - they are read. This is the only way of creating the narrowly-directed beams, independent of nature of wave processes and wavelength. Is correct reverse, if we see the narrowly directed beam, for example laser beam, then it is possible to assert that it is formed with the aid of the separate emitters, which emit signals with the large length of coherence and phase of which in the space they are added in those places, where we see ray itself. But unidirectional beams of light can be obtained by simpler way and this we not one time observed. If sunlight was passed through the opening, thus almost rectilinear ray is formed. But indeed sun itself emits monochromatic and far from coherent waves. But in than here the matter? If we make a good hologram with the aid of the laser of that emitting red light and to illuminate by its sunlight, then it is possible to see holographic picture in the red light. This experiment again confirms that in the composition of sunlight is this spectral line with the large length of

coherence, since only with the aid of the coherent light it is possible to see hologram. But as so, indeed the surface of the sun emits in no way coherent emission, and for some reason this noncoherent radiation from the sun suddenly at large distances becomes coherent. But give to move from the reverse, once is located the narrowly directed beam, which means, it it is formed with the aid of the addition of coherent signals. If we with the aid of the opening cut out ray from the distant star, thus will possess still smaller divergence and larger coherence than solar. The same experience can be made by the distant lamp, which is practically point-source radiator, and to obtain from it pencil beam. If we continue these experiments, then it is possible to see that the less the solid angle, at which is visible the source, the greater the coherence of signal it gives, moreover in entire range of the spectrum radiated by it. If we from this signal with the aid of the filter isolate the specific narrow spectrum band, then this ray will in no way differ from laser.

But why this strange special feature possess point luminous sources, nothing it is written about this in the existing literature. But the answer the like of the essence of the matter is very simple. If at the particular point space we observe the narrowly directed beam, then, as we already said, it can be formed only by the way of the additions of coherent components, which give separate emitters. On sun or star of the radiating atoms a huge quantity, moreover each with the radiation pattern and the frequency. But, since such atoms very much phase their emissions are chaotic, will always be located the specific quantity of atoms, the phases of emission of which will coincide into what that remote place, where we see the result of this addition in the form of rectilinear ray. Therefore any point source this is of its kind the laser, which emits spherical polychromatic ray. And already from this ray we can with the aid of the openings obtain narrow radial rays, and with the aid of the filters make with their monochromatic.