

# Computer Optics in the works of Professor I.N. Sisakyan

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## Abstract

In the 1970s, researchers were no longer satisfied with the traditional light control methods by means of lenses, mirrors, and diffraction gratings. Optical components were required that could solve more complex problems. Computer-generated holograms, especially digital holograms, theoretically, could perform any transformation of the light field. But the operation of the hologram in the first diffraction order makes it energetically ineffective. Optical elements were required that would be able to focus a powerful laser beam into a small area of an arbitrary type with almost 100 % efficiency. This is how the focusators, a fundamentally new type of optical elements, appeared in the early 80s.

**Keywords:** Computer Optics, lens, mirror, diffraction grating, computer-generated hologram, digital hologram, optical element, laser beam, focusator.

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## References

- [1] Golub MA, Karpeev SV, Prokhorov AM, Sisakyan IN, Soifer VA. Focusing light into a specified volume by computer-synthesized holograms. Soviet Technical Physics Letters 1981; 7(5): 264-266.
- [2] Danilov VA, Popov VV, Prokhorov AM, Sagatelyan DM, Sisakyan IN, Soifer VA. Synthesis of optical elements giving a focal line of arbitrary shape. Soviet Technical Physics Letters 1982; 8(7): 351-353.
- [3] Golub MA, Degtyarev AA, Klimov AN, Popov VV, Prokhorov AM, Sisakyan IN, Soifer VA. Computer synthesis of focusing elements for a CO2 laser. Soviet Technical Physics Letters 1982; 8(4): 195-196.
- [4] Golub MA, Sisakyan IN, Soifer VA. Infra-red radiation focusators. Opt Laser Eng 1991; 15(5): 297-309.
- [5] Golub MA, Prokhorov AM, Sisakyan IN, Soifer VA. Synthesis of spatial filters for investigation of the transverse mode composition of coherent radiation. Sov J Quantum Electron 1982; 12(9): 1208-1209.
- [6] Golub MA, Karpeev SV, Krivoshlykov SG, Prokhorov AM, Sisakyan IN, Soifer VA. Spatial filter investigation of the distribution of power between transverse modes in a fiber waveguide. Sov J Quantum Electron 1984; 14(9): 1255-1256.
- [7] Berezny AE, Prokhorov AM, Sisakyan IN, Soifer VA. Bessel optics [In Russian]. Dokl Acad Nauk SSSR 1984; 274(4): 802-804.
- [8] Berezny AE, Komarov SV, Prokhorov AM, Sisakyan IN, Soifer VA. Phase diffraction gratings with prescribed parameters: one inverse problem in optics [In Russian]. Dokl Acad Nauk SSSR 1986; 287(3): 623-627.
- [9] Krivoshlykov SG, Sisakyan IN. Coherent states and light propagation in inhomogeneous media. Sov J Quantum Electron 1980; 10(3): 312-318.
- [10] Krivoshlykov SG, Sisakyan IN. Coherent states and nonparaxial propagation of light in graded-index media. Sov J Quantum Electron 1983; 13(4): 455-458.