

Technology market
“RESEARCH TO BUSINESS”

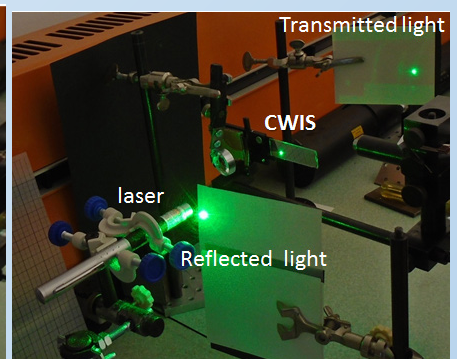
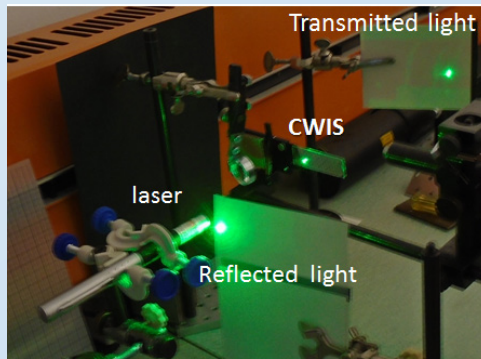
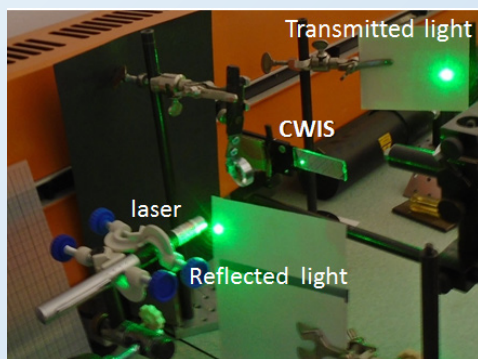
Offer № 007PA

**BEAM SPLITTER WITH COMPOSITE WEDGED INTERFERENCE
STRUCTURES**

Marin Nenchev, Margarita Deneva, Elena Stoykova

A monochromatic light beam splitter (LBS) with composite wedged interference structures (CWIS) for spatial division into separate beams of radiation from a single beam or for multiplexing of spatially separated beams into a single beam has been developed at the Technical University of Sofia, for which a patent has been issued in Bulgaria.

Application № 112846



Devices for spatial division of a light beam into separate beams, based on polarization or fiber-optic splitting, absorbing filters, variants of Fabry-Perot interferometers, single-angle interference wedged structure have disadvantages such as operation with low incident beam powers, polarized light, high energy losses, change of direction of the received beams at angular rotation, influence of external electric and magnetic fields, short linear section, change of transverse spatial structure of the beams, etc.

The challenge is a splitter with substantially improved properties, a simplified high-performance structure with a smooth linear transmission drop, without losses in the dielectric layers, and polarization-dependent operation.

Technical solution

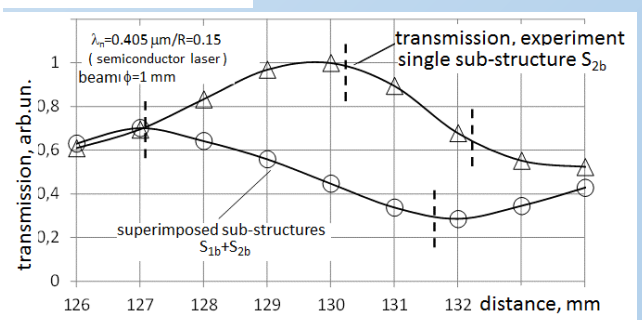
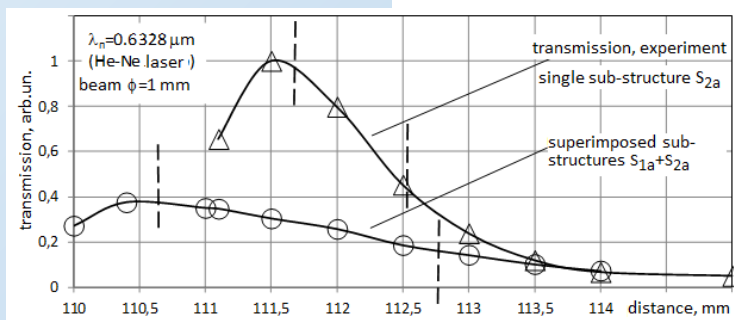
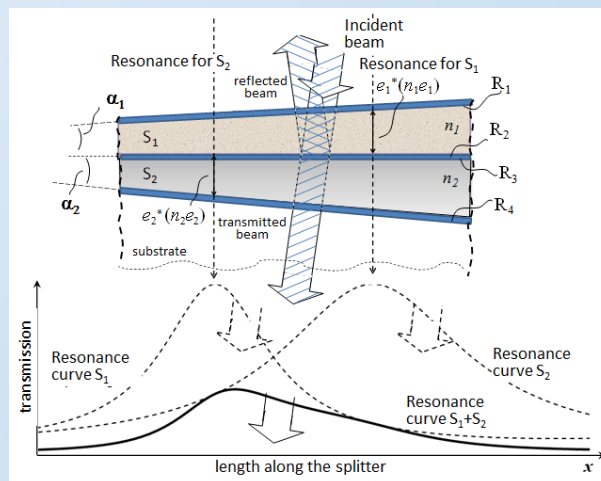
Researchers from TU-Sofia have created an RCC constructed of at least two wedged substructures superimposed along their length in geometry of successive incidence of transmitted radiation from the first to the subsequent one. The substructures are of equal length. They can be parallel wedged substrates and also can be partially reflecting and transmitting dielectric layers deposited on top of each other for maximum compactness. The surfaces of the substructures shall have a minimum flatness of $\lambda/4$, where λ is the central wavelength of light. Each substructure is substrate with a reflective dielectric layer or dielectric mirror applied to each of the surfaces. The substructures themselves may be wedged dielectric layers of titanium dioxide deposited on top of each other. The wedged layers are arranged to have mutually parallel Fizeau lines of equal slope. For two thicknesses e_1 and e_2 for one and the other substructure, respectively, the corresponding resonances overlap partially with a spacing between their maxima of a spacing length (in mm) of $1/4$ to $1/2$ of the half-width of the resonance line with the larger half-width.

Application and advantages

The monochromatic light beam splitter with composited wedged interference structures is a compact, including sheet-like type, simplified design with high beam-breaking resistance, with smoothly controllable power ratio in the two beams, with negligible energy losses during splitting, keeping the direction of propagation of the resulting beams, it can operate at high powers, without polarization requirements to the beams, without deformation of the transverse distribution during splitting.

It could be used for applications in optical devices, optical measurement and analysis systems, laser technology, scientific research practice, industrial optical instrumentation, optical communications, etc.

Technological images



Contact for this offer



Ralitsa Zayakova-Krushkova, Ph.D.

Innovation manager

Technical University of Sofia (TU – Sofia)

Knowledge and Technology Transfer Center (KTTC)

Tel.: +359887 804 745

E-mail: rzayakova@tu-sofia.bg

Knowledge and Technology Transfer Center

Technical University of Sofia, block 1, r. 1345, tel. (+359 2) 965 2546