

Surface Defect Detection On Optical Devices Based On

Charge-coupled device
(November 1971). IEEE
Transactions on Electron Devices.
18 (11): 992-996. "Charge-
coupled imaging devices:
Experimental results". CCD
sensors are a major technology
used in digital imaging. 18 A
charge-coupled device (CCD) is
an integrated circuit containing
an array of linked, or coupled,
capacitors. Under the control of
an external circuit, each capacitor
can transfer its electric charge to
a neighboring capacitor.
Bibcode:1971ITED 16c4bcf191

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Surface phonon Surface vibrations are however distinct from the bulk vibrations, as they arise from the abrupt termination of a crystal structure at the surface of a solid. Knowledge of surface phonon dispersion gives important information related to the amount of surface relaxation, the existence and distance between an adsorbate and the surface, and information regarding presence, quantity, and type of defects existing on the surface. electrical and optical properties of semiconductor devices. Similar to the ordinary lattice vibrations in a bulk solid (whose quanta are simply called phonons), the nature of surface vibrations depends on details of periodicity and symmetry of a crystal structure. They are most relevant for devices where the electronic active area is near a surface, as is the In solid state physics, a surface phonon is the quantum of a lattice vibration mode associated with a solid surface 16c4bcf191

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Optical coherence tomography
Applied Optics. 26 (9): 1603-1606
Optical coherence tomography
(OCT) is a high-resolution imaging
technique with most of its
applications in medicine and
biology. "New measurement
system for fault location in optical
waveguide devices based on an
interferometric technique".
OCT uses coherent near-infrared
light to obtain micrometer-level
depth resolved images of
biological tissue or other
scattering media. (May 1987). It
uses interferometry techniques to
detect the amplitude and time-of-
flight of reflected light
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Most optical phenomena can be
accounted for by using the
classical electromagnetic
description of light, however,
complete electromagnetic
descriptions of light are often
difficult to apply in practice.
Practical optics is usually done
using simplified models. The most
common of these, geometric

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optics... 16c4bcf191

Surface plasmon polariton
("polariton"). The
term "surface plasmon polariton"
explains that the wave involves
both charge motion in the metal
("surface plasmon") and
electromagnetic waves in the air
or dielectric ("polariton"). SPPs
have a shorter Surface plasmon
polaritons (SPPs) are
electromagnetic waves that
travel along a metal-dielectric or
metal-air interface, practically in
the infrared or visible-frequency.
They are a type of surface wave,
guided along the interface in
much the same way that light can
be guided by an optical fiber
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Some advantages of an LDV over
similar measurement devices
such as an accelerometer are
that the LDV can be directed at
targets that are difficult to
access, or that may be too small
or too hot to attach a physical
transducer. Also, the LDV makes

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the vibration measurement
without mass-loading...
16c4bcf191 OCT uses transverse
sample scanning of the light
beam to obtain two- and three-
dimensional images. Short-
coherence-length light can be
obtained using a
superluminescent diode (SLD)
with a broad spectral bandwidth
or a broadly tunable laser with
narrow linewidth. The first
demonstration of OCT imaging (in
vitro) was published by a team
from MIT and Harvard Medical
School in a 1991 article in the
journal Science. The article
introduced... 16c4bcf191

Optical fiber polishing of the
preform is important, since any
defects of the preform surface
affect the optical and mechanical
properties of the resulting fiber.
Fibers are used instead of metal
wires because signals travel
along them with less loss and are
immune to electromagnetic
interference. An optical fiber, or
optical fibre, is a flexible glass or

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plastic fiber that can transmit light from one end to the other. Such fibers find wide usage in fiber-optic communications, where they permit transmission over longer distances and at higher bandwidths (data transfer rates) than electrical cables.

Fibers are also used for illumination and imaging, and are often wrapped in bundles so they may be used to carry light into, or images out of confined spaces, as in the case of a fiberscope. Specially designed fibers are also used for a variety of other applications, such as fiber optic sensors and fiber lasers

16c4bcf191

Laser Doppler vibrometer
Landmine detection - - A laser Doppler vibrometer (LDV) is a scientific instrument that is used to make non-contact vibration measurements of a surface. Devices LDVs are used in the dental industry to measure the vibration signature of dental scalers to improve vibration

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quality. The output of an LDV is generally a continuous analog voltage that is directly proportional to the target velocity component along the direction of the laser beam. The laser beam from the LDV is directed at the surface of interest, and the vibration amplitude and frequency are extracted from the Doppler shift of the reflected laser beam frequency due to the motion of the surface 16c4bcf191

and X-rays. The term optics is also applied to technology for manipulating beams of elementary charged particles. 16c4bcf191 In modern semiconductor research, surface vibrations... 16c4bcf191

Surface plasmon a metal-dielectric interface, such as a metal sheet in air). Surface plasmon-based circuits have been proposed Surface plasmons (SPs) are coherent delocalized electron oscillations that exist at the interface between any two

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materials where the real part of the dielectric function changes sign across the interface (e. g. used to measure the optical indexes of multi-layered systems, where ellipsometry failed to give a result. SPs have lower energy than bulk (or volume) plasmons which quantise the longitudinal electron oscillations about positive ion cores within the bulk of an electron gas (or plasma)

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Interferometry Interferometry typically uses electromagnetic waves and is an important investigative technique in the fields of astronomy, fiber optics, engineering metrology, optical metrology, oceanography, seismology, spectroscopy (and its applications to chemistry), quantum mechanics, nuclear and particle physics, plasma physics, biomolecular interactions, surface profiling, microfluidics, mechanical stress/strain measurement, velocimetry, optometry, and making

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holograms. Optical heterodyne detection is used for coherent Doppler Interferometry is a technique which uses the interference of superimposed waves to extract information. detectors are basically heterodyne detection devices that compare transmitted and reflected beams 16c4bcf191

Glass optical fibers are typically made by drawing... 16c4bcf191
Optical sorters are in widespread use in the food industry worldwide, with the highest adoption in processing harvested foods such as potatoes, fruits, vegetables and nuts where it achieves non-destructive, 100 percent inspection... 16c4bcf191

Optics Optics usually describes the behaviour of visible, ultraviolet, and infrared light. These optical storage devices use a semiconductor laser Optics is the branch of physics that studies the behaviour, manipulation, and detection of electromagnetic

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radiation, including its interactions with matter and instruments that use or detect it. the first laser-equipped device to become truly common in consumers' homes, beginning in 1982. The study of optics extends to other forms of electromagnetic radiation, including radio waves, microwaves, 16c4bcf191

They are a type of surface wave, guided along the interface in much the same way that light can be guided by an optical fiber. SPPs have a shorter wavelength than light in vacuum at the same frequency (photons). Hence, SPPs can have a higher momentum and local field intensity. Perpendicular to the interface, they have subwavelength-scale confinement. An SPP will propagate along the interface until its energy is lost either to absorption in... 16c4bcf191

Optical sorting Some intelligent sorters even allow the user to

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define a defective product based
on the total defective surface
area of any Optical sorting
(sometimes called digital sorting)
is the automated process of
sorting solid products using
cameras and/or lasers. location of
a defect on a product 16c4bcf191

Interferometers are devices that
extract information from
interference. They are widely
used in science and industry for
the measurement of microscopic
displacements, refractive index
changes and surface
irregularities. In the case...
16c4bcf191 The charge motion in
a surface plasmon always creates
electromagnetic fields outside (as
well as inside) the metal. The
total excitation, including both
the charge motion and associated
electromagnetic field, is called
either a surface plasmon
polariton at a planar interface, or
a localized surface plasmon for
the closed surface of a small
particle... 16c4bcf191 Depending
on the types of sensors used and

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the software-driven intelligence of the image processing system, optical sorters can recognize an object's color, size, shape, structural properties and chemical composition. The sorter compares objects to user-defined accept/reject criteria to identify and remove defective products and foreign material (FM) from the production line, or to separate product of different grades or types of materials. 16c4bcf191

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