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Two-dimensional optics : diffraction and dispersion of surface plasmons

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Propositions

to be defended along with the dissertation

TWO-DIMENSIONAL OPTICS

I

The topological charge of an optical field distribution in a transverse plane is distinct from the expectation value of the orbital angular momentum per photon, except in axial symmetry.

This thesis, chapter 3

II

Two nanoslits on a gold film could be used as a wavefront sensor with much higher spatial resolution than the commonly-used Shack-Hartmann sensor.

This thesis, chapter 4

III

The damping of a driven oscillator, and the conductivity of the metal in surface plasmon resonance, cause similar displacements of their maximum response.

This thesis, chapter 5

IV

It is a misconception that the Otto configuration for studying surface plasmon resonances only causes difficulties.

This thesis, chapter 5

V

The temporal cloaking device will need to be paired with extremely slow light if it is to hide an event from human eyes.

Fridman et al. (2012). Nature 481, 62.

VI

Walking droplets are a good illustration of pilot wave theory at a macroscopic scale.

Couder et al. (2005). Nature 437, 208.

VII

There is an advantage to cheap CCD cameras' lack of an infrared filter: one can use a laptop or mobile phone to check if one's TV remote is still working.

VIII

There is a correlation between an object's color and the degree of polarization of the light it scatters.

Horváth et al. (2010). An unexpected advantage of whiteness in horses: the most horsefly-proof horse has a depolarizing white coat. Proc. R. Soc. B 277, 1643.

IX

The data cloud could have been developed forty years ago, had it not been for the baby boomers' distrust of centralization.

Foremski (2005, June 10). Exclusive interview with seminal 1960s computer visionary Doug Engelbart. Silicon Valley Watcher.

X

One can use a laser pointer to probe a cat's mechanical excitation states and their eigenfrequencies.

Amiss & Abbott (1995). Method of exercising a cat. United States Patent No. 5443036.

XI

Scientists who don't trust students' possibly clumsy hands on their research should work at a research institute instead of at a university.

Philip F. Chimento

March 7, 2013