PHYC30170 Physics with Astronomy and Space Science Lab 1; An Investigation of Surface Plasmon Resonance

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The aims of this experiment were to determine the excitation angle of the surface plasmon within the Kretschmann configuration and to investigate the dependence of surface plasmon resonance (SPR) on the wavelength of the incident light and the thickness of the silver foil. [NOT FINISHED]

I. INTRODUCTION

Surface plasmons are transverse magnetic waves, comprised of oscillating electrons, which travel along the boundary of a metal and a dielectric [1]. They were first discovered in 1957 by R. H. Ritchie The study of surface plasmons is very important and has many applications in biophysics, particularly in the analysis of biomolecular interactions [2], and in many fields of optics including but not limited to sub-wavelength optics and near-field optics [3].

II. THEORY

A. Excitation of Free Electrons

https://iopscience-iop-org.ucd.idm.oclc.org/article/10.1088/0022-3727/45/11/113001

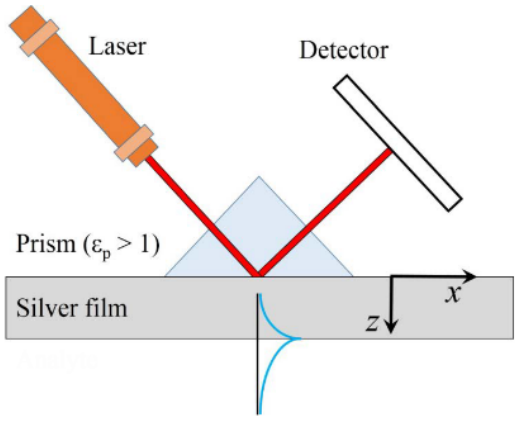

FIG. 1: The Kretschmann configuration. The silver film was evaporated onto the glass prism. The light from the laser excites the plasmons on the outer side of the film. [3]

B. Surface Plasmon Waves

C. Apparatus

The apparatus was set up as shown in figure **??**. More specifically, the Kretschmann configuration was used, figure 1.

III. METHODOLOGY

A. Apparatus Setup

1. *Motor Programming*

Be salty about things being labelled incorrectly.

2. *Developing an Algorithm for Data Collection*

Note efficiency

3. *Laser Alignment*

B. Data Collection

1.

IV. RESULTS AND ANALYSIS

A. Varying Laser Wavelength

B. Varying Metal Thickness

C. Anomaly found during Red Laser Runs

V. CONCLUSION

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[2] M. Canovi, J. Lucchetti, M. Stravalaci, F. Re, D. Moscatelli, P. Bigini, M. Salmona, and M. Gobbi, EnglishApplications of surface plasmon resonance (spr) for the characterization of nanoparticles developed for biomedical purposes, Sensors (Basel, Switzerland) **12**, 16420 (2012).

[3] J. Zhang, L. Zhang, and W. Xu, EnglishSurface plasmon polaritons: physics and applications, Journal of physics. D, Applied physics **45**, 113001 (2012).