THE ORIGIN OF THE DIFFRACTED LIGHT-

A REVISITING USING

THE RIGHT EXPERIMENT AND METHOD,

AT THE AGORA LABORATORY FOR CLASS AND COMMUNITY (ALC)

1) AN OVERLOOKED EXPERIMENT

Surprisingly, an important measurement was overlooked in the elementary experiment of single edge diffraction in optics. Does the diffracted light in geometrical optics depend on the laser beam thickness? We pursue an exhaustive measurement to answer this question. Both a "YES" or a "NO" would be important, as they prove without a doubt two opposing views regarding the origin of diffracted light.

A "NO" would force new ideas regarding the physics of light. Such a case is not impossible, considering the many difficulties in the theory of light. Something simple could have been overlooked … ☺. It is worth to give it a try. The experimental procedure is relatively complex – the edge must be placed exactly on the beam axis, the diffracted light is weak and varies strongly, etc. Exhaustive measurements will take a long time. So we need help.

2) A FORGOTTEN METHOD

A long-term focus of a small class/community on the above important experiment; an informal debate, analysis and synthetic thinking at a deliberate pace; an attempt to obtain new data and an advanced synthesis of the opposing views (a synthetic view) on the diffracted light: we call this method

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- to recognize the small school for advanced synthesis of Ancient Greece.

3) COULD ALC BE A GENERAL METHOD FOR SYNTHETIC VIEWS?

We think that synthetic views are a major need wherever opposing views produce devastation in society. Could ALC be a missing method for construction and education of such views, at least in technologically advanced societies?

Can ALC for instance produce a synthetic view from the liberal-conservative opposing views? It is worth to explore this possibility, too … ☺

For more info, see an extended form of this flyer at www.agoralab.org

GENERAL ALC MEETINGS: EVERY SUNDAY STARTING WITH 07/25/10, 2 PM.

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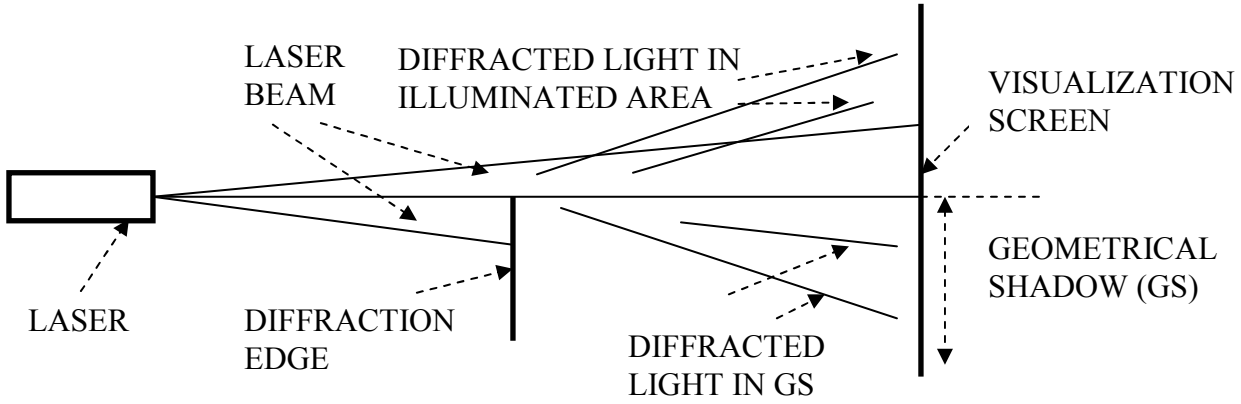
TEL 217 328 5227, LOCATION VERY CLOSE TO BECKMANN INSTITUTE – UIUC.

MEASURING DIFFRACTED LIGHT IN THE GEOMETRICAL SHADOW FOR EDGE DIFFRACTION



The diffracted light in the geometrical shadow (GS) is weak and varies abruptly at large distances from the diffracting edge. Our software includes adequate numerical calculations. Our experimental setup (about $12000) includes a high quality laser, suitable detectors, and positioning systems and methods, notably an accurate positioning of the sharp diffracting edge relative to the laser beam axis. For this purpose we have developed a large micrometer slit with independently moving and removable sharp edges. Each of these two edges is used for single edge diffraction and the symmetry of the diffraction patterns is used for exact positioning on the beam axis. Exhaustive measurements and verifications will take a long time and the effort of many people.

Until now we measured the diffracted light only on the beam axis itself, and studied the double-edge diffraction in the geometrical shadow. The results seem to contradict the regular electromagnetic predictions. For instance, when the diffracting edge is perpendicular on and touches the beam axis, the theory predicts a diffracted intensity on the beam axis of 1/4 the intensity without diffracting edge, while our experiment shows values between 1/5 and 1/4 depending on the specific shape of the edge. This and the well-known issues in understanding the physical nature of light suggest that there could be simple facts that are currently overlooked. The diffracted light in the geometrical shadow might be such a fact. We think that this diffracted light depends only on the intensity of the beam at the diffracting edge itself, and not on the beam thickness.

Historically, there have been two opposing points of view as to where the diffracted light originates: a) the space outside the diffracting edges and in the edges themselves. This is a result of assuming a wave behavior for light. The extreme case of the infinite plane wave gives very different diffracted light in GS as compared to any finite beam, i.e., the beam thickness matters; b) the space of the diffracting edges only – in their material. If this is physically the case, then the beam thickness does not matter and therefore it is impossible that light behaves like regular electromagnetic or quantum waves. Indeed, if it did, then the diffracted light in GS would arise as in case (a), i.e. not only in the material edges. We think that our experiment will support case (b).

ALC AS A GENERAL METHOD FOR PRODUCING AND EDUCATING SYNTHETIC VIEWS IN SOCIETY, AND AN APPLICATION TO A FUNDAMENTAL SOCIAL PROBLEM

INTRODUCTION

We try to answer the following two questions. Is there a major need in society for synthetic views that complement the large scale "economical" and fast thinking? Is ALC the missing method for a systematic development and education of synthetic views?

We think that synthetic views are indeed a major need. Indeed, it is not hard to see that the bigger picture (synthetic views) and a continuous renewal are necessary for any fundamental problem where devastating opposing views and conflicts are prevalent, towards a wiser communication, reaching agreements and development. Such problems are numerous and present in all types of communities.

To support ALC as a general method for knowledge production and education we discuss the general aspects of the ALC method and its application to two cases: the opposing views on light diffraction and a significant social problem. The first case is only mentioned here as a basis for the discovery and demonstration of ALC – in this respect this case is the main subject of our ALC for the next few years. Here we explore in some detail whether the application of ALC over several years could produce a synthetic view and offer a better perspective on the bigger picture for the liberal-conservative polarization. These synthetic views are a major need in a complex, mixed and fast-moving system, and would help develop a better understanding of society, towards wiser communication among people and the reaching of agreements, reducing devastating propaganda and conflict.

If the synthetic power of ALC is demonstrated, then the field of synthetic views becomes a place for individual and collective initiative and business with a strong influence on education and development.

ALC – A GENERAL METHOD FOR SYNTHETIC VIEWS

Generally speaking, the ALC method is based on the extended focus of a small laboratory (group of study) on a single crucial experiment or issue (using the scientific method), combined with an advanced synthesis of the related opposing views. It is easy to see that such an approach is an attempt to revive the ancient method for advanced synthesis on fundamentals – the small school involving people of different ages and levels of knowledge – for teaching, informal debating and speech development on a single issue over many years, with the aim of producing synthetic views (SVs). This advanced synthesis was present on a significant scale mainly during Ancient Greece and the Renaissance, when it proved itself by creating many of the world's basic concepts. Our ALC adds to it the focus on exact experimenting for a long time on a single crucial issue. We attempt to demonstrate the synthetic power of ALC by a focus on an experiment on the origin of diffracted light, and we think such an ALC will eventually be successful in creating a simple SV from the opposing views on the origin of diffracted light, if applied persistently enough, and perhaps by different ALC groups. If the synthetic power of ALC is demonstrated for light, ALC could revive the significance of synthetic thinking. Then the

ALC method could be accepted in school and communities as a revival of the ancient small school for synthesis, and applied on a large scale in any area of study with great benefits. Hence, ALC could constitute a general method for developing synthetic views and basic concepts in our time, a method that should supplement/complement the usual fast-paced "economical" thinking. In contrast with the latter, the advanced synthesis allows going through the slow process of both escaping from an existing complex thinking, and realizing the new evidence of the complex object of study. Such a method can solve fundamental problems that are present around us but which either seem too complicated to tackle (with the current approaches), or too hard to see, and can produce the following results: a) a bigger picture and a renewal for any fundamental problem where devastating opposing views and conflicts are prevalent, for wiser communication, agreement and development; such problems are numerous and present in all types of communities – an example is the complete polarization of the liberal-conservative views on society and economy, b) an inventory of major fundamental issues/problems, some of which may be very difficult to see, and c) synthetic views for each of these problems. Below we give an example and an inventory of fundamental problems where ALC could be used.

APPLICATION OF ALC TO THE OPPOSING VIEWS OF LIBERALS AND CONSERVATIVES

As an example, we explore whether ALC could produce the SVs and the bigger picture for the liberal-conservative polarization of views.

How to produce these SVs? The concepts of liberalism and conservatism characterize the views and attitudes of people regarding the main aspects of society, economy and spirituality, such as liberty and government, market, property, personal responsibility, new ideas in understanding society and science, etc. These attitudes help each individual orient himself/herself both in his/her individual activity and in social interactions and events, and thus they have played a very important role in the history.

The trouble with these attitudes and views is that they are formed and used in the context of a major lack; namely, an insufficient knowledge of the processes and mechanisms of society. Two important reasons for this lack of knowledge are: a) the fast-paced education and development with insufficient synthesis to escape from poor ways of thinking and from oversimplified logics that lead to conflict and to thoroughly understand new aspects and evidences, and b) the lack of a method and instrument for advanced synthesis …

This means that both liberals and the conservatives initiate and develop solutions in the context of insufficient knowledge, which often gives rise to serious troubles and mistakes. Also, this leads to using a devastating propaganda based on the "my positives and your negatives" approach to support agendas. Are such claims true? They are, indeed. It is easy to see that throughout the history both these views could not solve comprehensively the problems of society. Crises, conflicts and wars were always present. Hence, both these views could bring only partial solutions, certainly with some wonderful positive accomplishments but also with major negative results, crises and conflicts. A few of these major positives and negatives on both sides can be easily agreed upon by following throughout the history the attitude regarding new ideas. A study of key historical events can show that both easy acceptance of and resistance to new ideas have generated terrible negative effects in history. However, for keeping this text short, we will do this later. As we

will see, it will constitute the focus of the ALC synthesis that will produce a comprehensive list of such positives and negatives for both sides: liberals and conservatives.

What is an advanced synthesis for these opposing views, and what is the bigger picture in this context? Suppose that we focus a synthesis on the positives and negatives of the liberal and conservative views throughout history. And suppose, also, that we succeed in building a wisely-formulated document (like the human rights declaration) containing this synthetic view, which could be accepted in time by both liberals and conservatives. Then we can say that we started to build a bigger picture to close the gap between these opposing views. On this basis, suppose that through a large scale synthesis we can find and experiment the social mechanisms that lead mainly to positive effects and avoid crises and conflicts. In this case the bigger picture becomes a reality.

In other words, this bigger picture can both close the gap between liberals and conservatives and radically improve knowledge on societal processes and mechanisms. This solution necessarily involves the advanced synthesis of views through an ALC-type method, as the Ancient Greeks were starting to do … Indeed, the general purpose of the ALC is to produce synthetic views that are well experimented for each fundamental problem in society. In general, the advanced synthesis for creating synthetic views is a method required and specific for solving fundamental problems in science and society, while the fast-paced economical (positive) approach is appropriate and powerful for R&D problems where immediate results are possible.

But without the synthetic views even societies that have developed advanced technology and function democratically remain at a primitive level of civilization. Indeed, the catastrophic conflicts and wars of the XIX – XXI centuries in Europe and America were impossible to avoid precisely because there existed radically opposing views. Without synthetic views, an aging democracy becomes more and more difficult to handle, and eventually will die. Whereas with such synthetic views, the system could undergo a functional renewal that can handle a fast-growing complexity and can diminish the devastation from lack of basic knowledge, from crises, propaganda and conflict. One can expect a wise understanding and development, more challenge and opportunity for people.

How to apply the ALC in our current situation? For the beginning, one or a few small ALC schools could provide a wise synthesis of the positives and negatives for both the liberal and the conservative views throughout history. This synthesis would give a first form for the bigger picture and the renewal of these views which are of great importance today. If a document with this bigger picture is established and becomes well known, it would increase consensus and reduce the propaganda and conflict for the benefit of democracy. Then, in time, as ALC becomes part of the education and development system, it would also provide a much better understanding of the fundamental problems of society and economics, and a much better form of the bigger picture for the liberal-conservative views.

Based on the type of requirements and anticipated benefits mentioned above, we see ALC as a missing essential element in any society, for making feasible a steady, peaceful, and wise renewal of basics and the entire system, through individual and collective enterprise.

A PARTIAL INVENTORY OF FUNDAMENTAL PROBLEMS WHERE ALC SYNTHESIS WOULD BE ESSENTIAL

1) the mechanism for generating dreams and strong challenges for individuals;
2) the fundamental limits of capitalism;
3) liberal-conservative opposing views (positives and negatives);
4) national positives and negatives;
5) synthetic thinking versus speculative thinking in human history (starting with the primitive age).

We need to IMPROVE and try to PUBLISH the following text on ALC as a method for building synthetic views in general, for the diffracted light in a detailed application-demonstration, and for the liberal-conservative polarization as an example to be explored.

A MISSING ESSENTIAL ELEMENT IN SCHOOL AND COMMUNITY:

THE AGORA LABORATORY FOR CLASS AND COMMUNITY (ALC) –

A METHOD TO PRODUCE A SYNTHETIC VIEW (THE BIGGER PICTURE) AND A RENEWAL OF THE CONCEPTS FOR FUNDAMENTAL SOCIAL AND SCIENCE PROBLEMS WHERE DEVASTATING OPPOSING VIEWS AND CONFLICTS ARE PREVALENT:

THE APPLICATION OF ALC FOR THE RELAXATION OF THE STRONG POLARIZATION OF THE LIBERAL-CONSERVATIVE VIEWS ON SOCIETY AND ECONOMICS, TOWARDS WISER COMMUNICATION AMONG PEOPLE, REACHING OF AGREEMENTS AND DEVELOPMENT

Use the text on pages 3 - 6