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ACADEMIC DOCTRINE OF LIGHT. ESIAH CONCEPT

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Abstract: *Light is a herald of the beauty and the harmony. Contrary to this philosophy and the expectations of the majority, modern picture turns the night into a day. Moreover, the light "improvements" of the night vision in urban areas often happens to harm the natural rhythm - the starry sky disappear, the 24-hour circadian rhythm is disturbed. The level of intellectual development of the way the light is used dictates the course of human civilization.*

Keywords: *Academic Doctrine; Esiah concept; Light pollution; Light; Lighting; Environment; Obtrusive light, Automotive Lighting Metasculpture; Mtemob (Metamobile); Light Information Field; Semantic Fractal; Visual Glare; Light Pollution; Management of light pollution; ΦΕΕΑRA Mm concept; Zet-model; Generalized Hexagonale Model of Lighting.*

INTRODUCTION

Light is a herald of the beauty and the harmony. Contrary to this philosophy and the expectations of the majority, modern picture turns the night into a day. Moreover, the light "improvements" of the night vision in urban areas often happens to harm the natural rhythm - the starry sky disappear, the 24-hour circadian rhythm is disturbed. The level of intellectual development of the way the light is used dictates the course of human civilization.

Contemporary lighting systems are still experiencing their teenage period. Exterior lighting produce a significant amount of light scattering that in many cases goes beyond the acceptable limits. The free light distribution produced by the Automotive Lighting and the Road Lighting create the well-known light scheme that cause *light pollution* of the natural environment, light pollution of the urbanized areas, incl. *systemic visual glare* that society still tends to perceive as normal and acceptable. In this regard, there is a necessity of *a new light culture* that would harmonize the present conditions.

EXPOSITION

A. Background

Modern lighting systems tends to follow a common frame: light – lighting – lighting environment – light-based semantic field – smart cities. The quality culture of lighting design is based on an achieved balance between functionality and aesthetics defining the purpose of each lighting system. Functional lighting relies on light-based technical norms, according to which quantitative and qualitative indicators of lighting systems should satisfy the type of the visual tasks, hence the light applied "where necessary, as much as necessary" (Vassilev N., I. Vassileva, 2007). This implies minimal investments, minimum operating (including energy) costs, guaranteed quantity, quality and safety of the functional lighting.

Decorative lighting systems on the other hand are devoted to the emotional impact and aesthetics, revealing the beauty of the lighting environment. The creative freedom of the decorative lighting follows its own rules associated with the level of information expressiveness and light comfort, which in few cases puts the observer under test.

History, especially the recent, shows that every human activity is in a state of progress, but at a certain point it begins to move out of the socially acceptable norms. Particularly, the contemporary lighting technologies often lead to a significant violation of the reasonable limits. As a result the Visual Glare and the Light Pollution are two major issues that still are dominating on the road.

B. The Automotive Lighting Sculpture

The quality culture of lighting implies the existence of a synchronization between the Road Lighting and Automotive Lighting leading to a state of joint work and a subsequent harmonization, which evokes the presence of a synergetic interaction. It aims to draw the attention to the Measure of the artificial light impact – defining the *"borders"* of lighting design, as well as the conceptual "over-space" recognized as *"beyond borders"* where designers often tend to find irrational horizons to existing unsolved problems. The *Automotive Lighting Sculpture* concept is a representative of the "beyond borders" approach.

Fig. 1. The Evolution of the Automotive Lighting Sculpture concept.

C. The Semantic Fractal

The Automotive Lighting Sculpture, the ALS concept in short, has a history that began more than a decade ago at the end of 2005 (Kyuchukov T., 2006). *Born Beyond Existing Borders*, the ALS idea explores a series of *conceptual sculptural and light-based metamorphoses*, and despite the vague picture, the idea has succeeded in overcoming the psychological barriers and paving its way on an experimental basis as a *contemporary scientific-research avant-garde* (Kyuchukov T., 2008 a,b; 2009; 2010 a,b; 2012 c;)

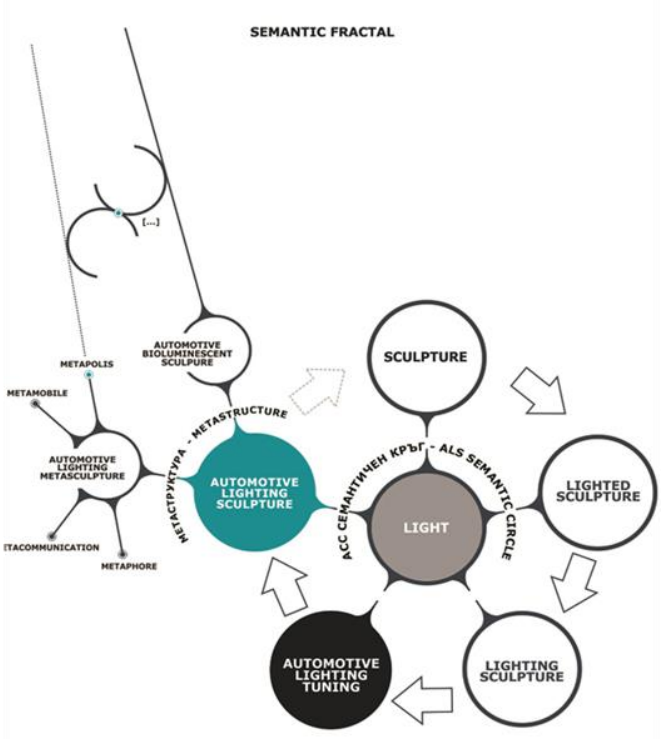

Fig. 2. The Semantic Fractal. Evolution of the Automotive Lighting Sculpture concept. Born Beyond Existing Borders, (Kyuchukov T., 2018).

The Automotive Lighting Sculpture is looking for unusual, unexpected, unconventional images. "Something" on four wheels, drawings that represent the behaviour an open non-linear system, susceptible to experiments, interpretations and metamorphoses, independent of the standard requirements and constraints typical for post-industrial products, and in particular transportation vehicles. The ALS concept is a product of creative and intellectual recklessness - on the basis of accumulated experience and knowledge, one intuitively "connects dots" to the moment one sees the occurrence of semantics, interaction, symbiosis between the individual elements.

The concept evokes the emergence of metaphorical (associative) thinking, in the form of a "brainstorming", in which heuristics and transfer of information between close and or remote units are applied, in order to obtain new original solutions that, first, stimulate the creative process, and second, lead to seemingly difficult ideas, concepts, solutions. (Kyuchukov T., 2014 b, 2015 b).

A manifestation of creative recklessness, it can also be perceived as a performance of non-linear thinking - an attempt to step beyond the boundaries of the status quo, the well-known, the accepted and the enforced, to challenge the personal thesaurus and uncover the characters beyond imagination; the presence of intellectual adventure, a form of *elegant meta-communication* (Kyuchukov T., 2018).

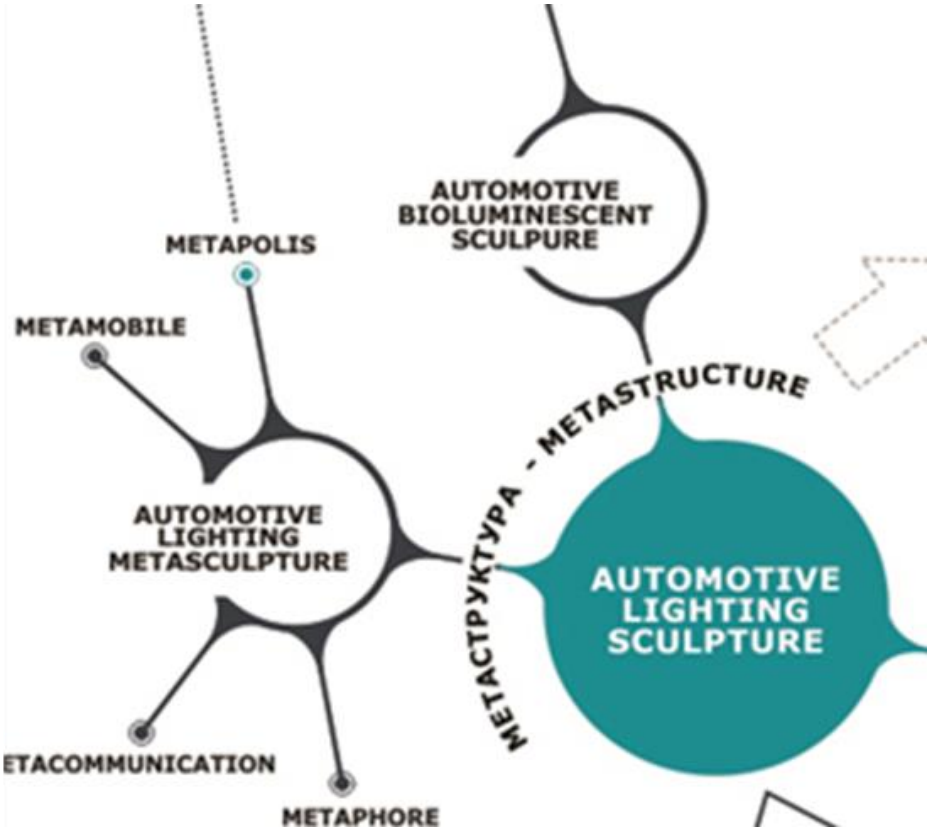

Fig. 3. The Semantic Fractal. The place of the Metamob (Metamobile), (Kyuchukov T., 2018).

The *ΦEEARA Mm concept* is a design study of a futuristic automotive metasculpture that aims to draw the attention to the lighting aggression on the road. It represents the image of the Metamob (Mm) as a metaphor that provokes questions about the hypothetical successor of the present vehicles, with the emergence of a new generation intelligent lighting - the so-called *"engaged light"* and respectively the *"light-based semantic field"*.

The concept introduces the idea of the *"elegant lighting metacommunication"* as an alternative to the interaction between Road lighting and Automotive lighting. The elegant lighting metacommunication reveals the presence of light-based semantic information field that would provide satisfing conditions for shared behavior among all participants to the point of achieveing better safety conditions, (Kyuchukov T., 2018).

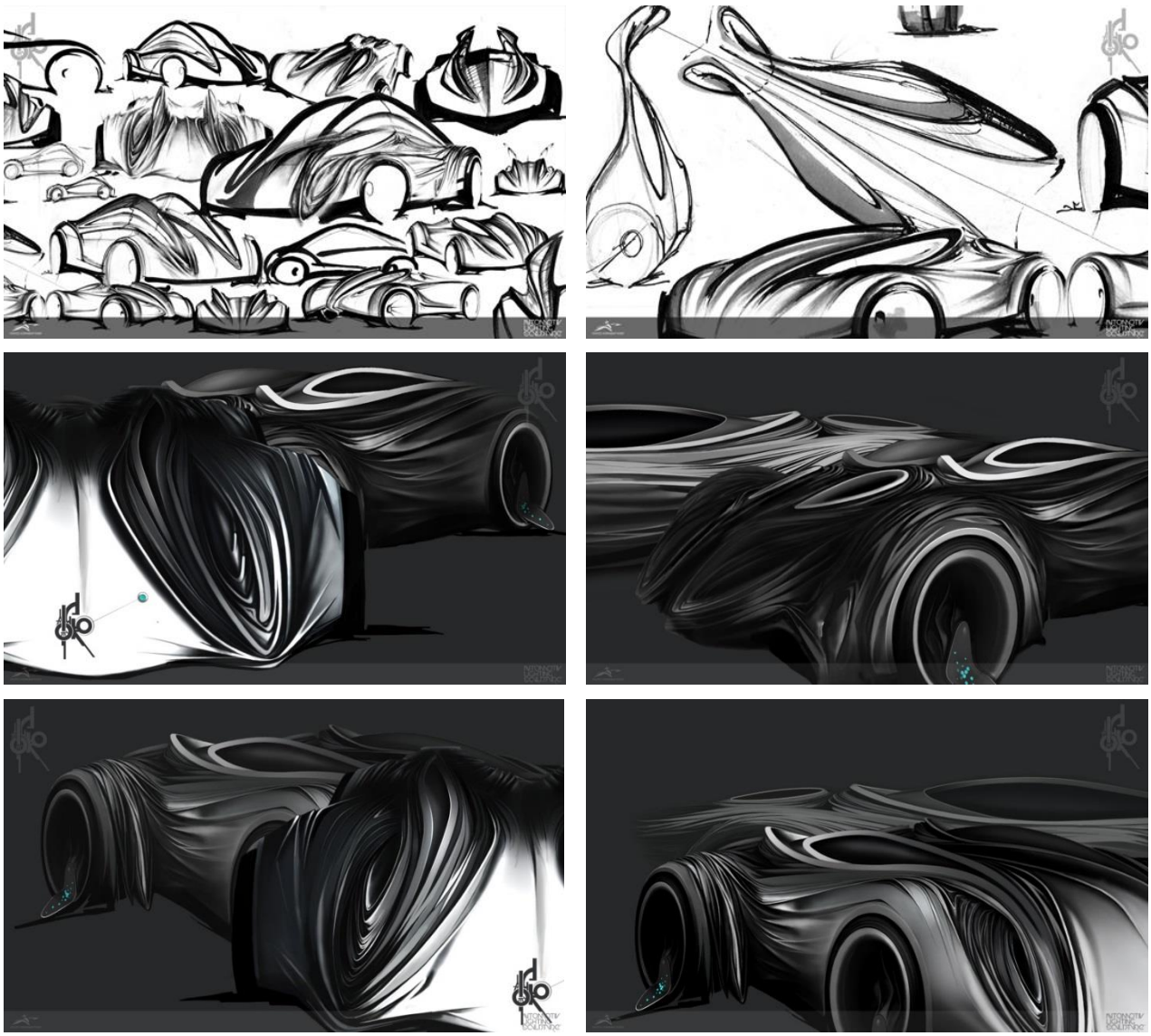

Fig. 4. The ΦEEARA Mm concept. (1-6) Sketches and renders, (Kyuchukov T., 2018).

D. Light-based semantic information field (LIF).

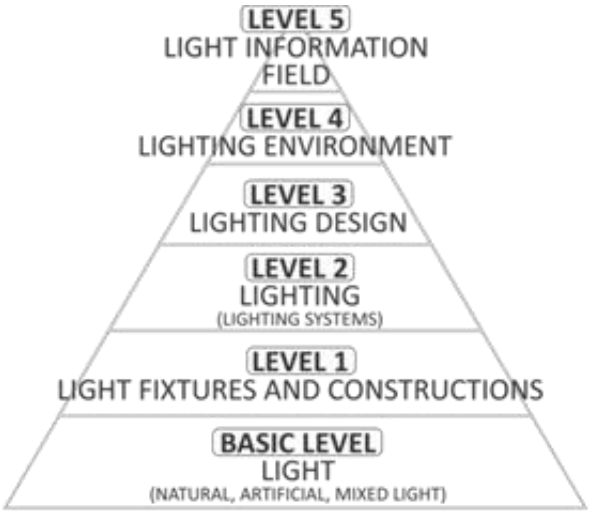

Fig. 5. Block diagram presenting the methodological approach for light pollution management. The presence of Light-based semantic information field (LIF), (Kyuchukov T., 2019).

E. The ZET-model

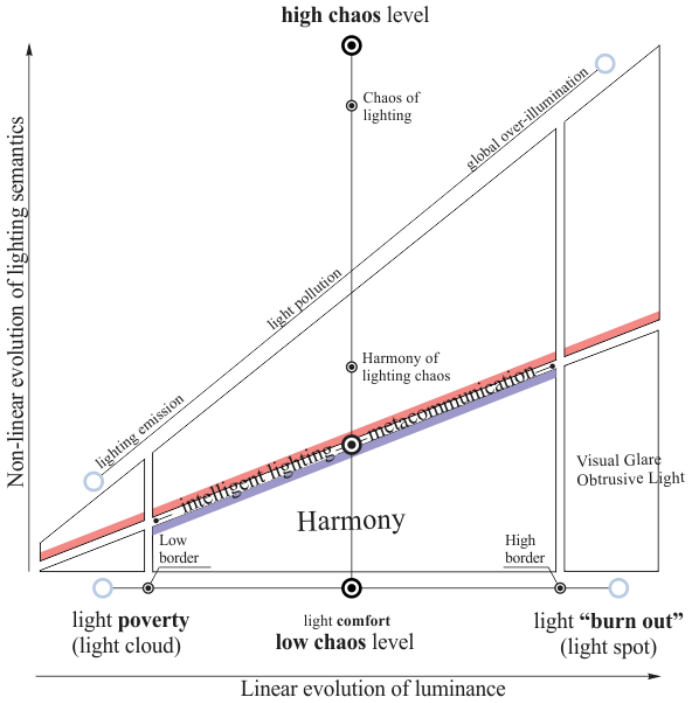

Fig. 6. The ZET-model, (Kyuchukov T., 2019).

F. Quality of Higher Education

The quality of higher education in the field of lighting and lighting design has national, European and global dimensions and evaluation. In recent years, a number of events and activities have been held related to higher education in Bulgaria and in particular to education in the field of lighting and lighting design.

2017 marked the 50th anniversary of the adoption of the National Lighting Committee as a member of the Commission International de l'Eclairage (CIE) at the Congress in Washington in September 1967. A National program also to marked the International Year of Light and Light Technology. A Strategy for the Development of Higher Education in the Republic of Bulgaria for the period 2014-2020 is being implemented. In 2015, Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) were approved (ESG, 2015). The criteria systems of the National Agency for Evaluation and Accreditation (NEAA), adopted by the Accreditation Council of NEAA on October 10, 2016, are practically applied (NEAA, 2016).

By decision of the 68th UN General Assembly (20.12.2013), 2015 was declared the International Year of Light and Light Technology (IYL, 2015). It was also marked by the national lighting community of the Republic of Bulgaria. A National Organizing Committee for the celebration of the International Year of Light and Light Technologies in Bulgaria was established, chaired by Acad. Stefan Vodenicharov, Chairman (2012-2016) of the Bulgarian Academy of Sciences. The national program for the celebration of the International Year of Light and Light Technologies contained two sub-programs: "Light Technologies and Applied Lighting" and "Optics and Science of Light in the Year of Light".

At the Conference of Ministers responsible for higher education in the European Union, held on 14-15 May 2015 in Yerevan, Standards and Guidelines for Quality Assurance were approved in the European Higher Education Area (ESG) in the European Higher Education Area (ESG, 2015). The approval was confirmed by the representative European structures presented in Table 1.

The main objective of the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) is to contribute to overall cross-border cooperation among all stakeholders in quality assurance in teaching and learning. The term "Quality Assurance" covers all activities in the continuous cycle of improvement - the activities for quality assurance and

improvement. The ESGs are used by quality assurance institutions and agencies as a reference document for internal and external quality assurance systems in higher education. The following goals and principles are formulated:

- setting a common framework for quality assurance systems for learning and teaching at European, national and institutional level;
- opportunity to ensure and improve the quality of higher education in the European Higher Education Area;
- support for mutual trust, thus facilitating recognition and mobility within and beyond national borders;
- providing information on quality assurance in ENQA.

Table 1. ESG highlights

ESG highlights	
Innovations	A crucial role of scientific research and innovative solutions in support of social unity, economic growth and global competitiveness;
Knowledge	Higher education is to play an essential role in the socio-economic and cultural development by the establishment of European communities dedicated to knowledge in particular.
Adequacy	An increasing demand for skills and competences requires that higher education should respond in a new way;
Change	Fundamental change in the learning and teaching approach: more focused on students; covering flexible training models; recognizing the competences acquired outside the formal curriculum;
Missions	Universities should become more diverse in terms of their missions, ways of delivering education and cooperation, including increasing internationalization, digital learning and new forms of education delivery;
Assistance	The crucial role of quality assurance in higher education systems and institutions as an adequate response to these changes by considering the qualifications achieved by students and their experience in higher education remain at the heart of the missions of the institutions.
Quality of training	The main objective of the ESG Standards and Guidelines for Quality Assurance is to contribute to the overall cross-border collaboration amongst all academic representatives. The term "quality assurance" covers all activities in the continuous improvement cycle - the quality assurance and improvement activities. ESG is used by quality assurance institutions and agencies as a reference document for internal and external quality assurance systems for higher education.
General framework	Setting a common framework of quality assurance systems for learning and teaching at European, national and institutional levels;
European space	Providing possibilities and enhancing the quality of higher education in the European Higher Education Area;
Mutual trust	Supporting mutual trust, thus facilitating recognition and mobility within and across national borders;
Accessibility	Providing quality assurance information to ENQA.

G. The ESIAH concept

Table 2 expresses the idea of Esiah concept. It represents the directions that would affect the evolution of the higher education in the future. It stands as a symbol and concept dedicated to the University of the Future. The name is formulated by the following words: *Examination, Skills, Idea, Attractors, Harmony*, hence *Esiah concept – Academic Doctrine of Light.*

Table 2. Academic doctrine of light. Esiah concept

Esiah Concept	
Thorough examinations and analyses	Higher education has the aim to contribute to the students' ability to conduct thorough ***E*xaminations** and analyses towards the new tendencies and technologies in contemporary lighting design as well as to identify the new times necessities and preferences.
Original ideas	To challenge students to develop their own athors original ***I*deas** of a strong innovative and creative nature.
Communication skills improved	To contribute to the development of students' technical, verbal, writing and representational ***S*kills**.
Personal expression of harmony	To help students develop their own personal expression of ***H*armony**, closely studying the experience of the past and present.
Purposeful attractors	To help students and young scientific researchers find their own targeted ***A*ttractors**, to support them develop in the centers of Alma Mater and share them as ambassadors of contemporary science and culture throughout the world.

CONCLUSION

The question that still arises at present is when the average citizen and the representatives of lighting industry will identify the existence of the Light Pollution and the Visual Glare as harm rather than a benefit. Visual culture is educated through the realization of adequate lighting environment. Several international campaigns devoted to the use of the artificial light are of great significance because they wake up and focus public attention and awareness on the light pollution issue and its impact. The benefit of those campaigns does not relate to their demonstrational manner, but to the lack of adequate energy and environmental culture that should corresponds to the present high-technological progress. It is necessary to rethink the artificial light, the understanding of the hygiene of lighting especially if it is overdosed and unsatisfactorily managed. Aren't we on the verge of a new lighting technological age?

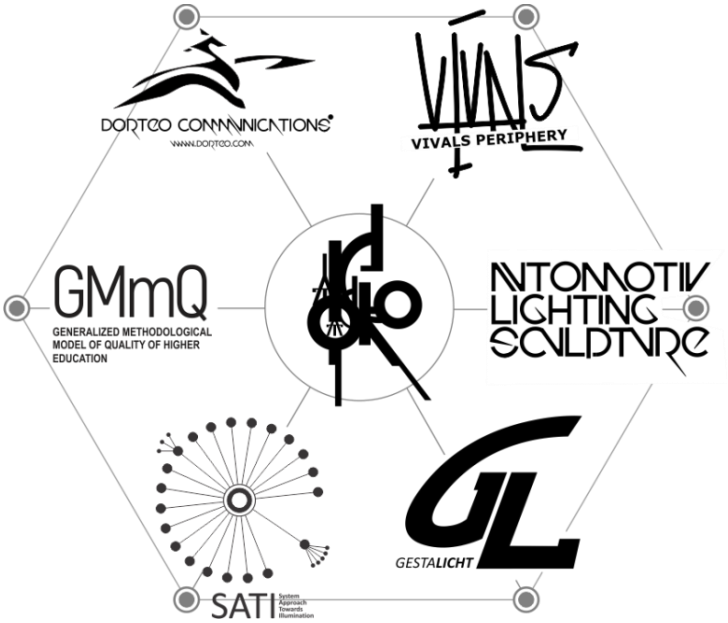

Fig.7. Generalized Hexagonal Model of Lighting (GHmL), incl. Dorteo Communications; VivalsPeriphery; Automotive Lighting Sculpture; Gestalicht; SATI system; GMmQ model.

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