

PROCESSO SELETIVO – TURMA DE 2008

FASE 1 – PROVA DE INGLÊS

O texto a seguir é um trecho de um trabalho de um grupo de pesquisa em Ensino de Física. Você deve apresentar uma versão em português deste texto. É permitida a consulta a dicionários.

Light, in its complex physical nature, has been a great puzzle to mankind for ages, and presents many difficulties in our attempts to understand it. As Einstein once said, “I would like to spend the rest of my life thinking about what light is.”

In the course of time, therefore, varying models of light have been developed, which help us to be able to clarify light and its behavior: the ray model, the wave model according to Huygens, the particle model according to Newton, the photon model and the phasor model according to Feynman. The models co-exist and are all “equally correct.” A model can be neither right nor wrong, but rather useful or useless, since it serves the purpose of perspective and presentation which lay outside of human perception. One can therefore only determine if a model is appropriate for a certain phenomenon which, for the students, means that it can be explained. In this sense, different people can explain one phenomenon with different models, as long as the approach is logical and conclusive.

The five models of light can be classified into different categories of models. They are differentiated according to concrete and abstract types of models. The former are also designated as models of objects and include, for example, the globe and model train. The abstract model is subdivided into iconic (pictorial) models and into symbolic or mathematical abstract models. Iconic models result from the human spirit, imagination, which man creates from something real but otherwise intangible. According to the extent of the relationship to reality, one can divide the iconic models into two forms: those, that develop from the idealization of reality and those, that only exist in the imagination – hardly having any relation to reality.

The ray model of light is an idealization, while the particle and wave models belong to the second category of iconic models. The Feynman phasor model, which can be justified through didactic reasoning from quantum electrodynamics, is an example of an abstract-mathematical model. These models are structures between the quantities in physics, which cannot be observed or only with great difficulty. They evade a viewable interpretation and are only understood as symbols of reality.

Difficulties of Model Construction in Optics

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Disponível em <http://arxiv.org/ftp/physics/papers/0402/0402080.pdf>, consultado em 25/10/2007.

