proceedings

MDPI

Abstract

Intrinsic Symmetry of the Dark Fluid Electrodynamics †

Alexander Balakin

Department of General Relativity and Gravitation, Institute of Physics, Kazan Federal University, Kazan 420008, Russia; Alexander.Balakin@kpfu.ru

† Presented at Symmetry 2017—The First International Conference on Symmetry, Barcelona, Spain, 16–18 October 2017.

Published: 3 January 2018

Cosmic Dark Fluid is considered as a non-stationary medium, in which electromagnetic waves propagate, and magneto-electric field structures emerge and evolve. The Dark Fluid is assumed to be formed by a duet of Dark Matter (a pseudoscalar axionic constituent) and Dark Energy (a scalar element). The purpose of the talk is two-fold: on the one hand, we distinguish electrodynamic effects induced by these two constituents of the Dark Fluid; on the other hand, we try to find a specific internal symmetry between them. A medium-type representation of the Dark Fluid allows us to involve into analysis the concepts and mathematical formalism elaborated in the framework of classical covariant electrodynamics of continua, and to distinguish dark analogs of well-known medium-effects, such as optical activity, pyro-electricity, piezo-magnetism, electro-and magneto-striction and dynamo-optical activity. We discuss ten models, which describe electrodynamic effects induced by the Dark Matter and/or Dark Energy. The discussion of the structure of these models is accompanied by examples of exact solutions to the master equations, correspondingly extended; applications are considered for cosmology and space-times with spherical and pp-wave symmetries.

Reference

1. Balakin, A.B. Electrodynamics of a Cosmic Dark Fluid. *Symmetry* **2016**, *8*, doi:10.3390/sym8070056.