International Conference on Mathematical Modeling and Computational Physics













MMCP 2015 Book of Abstracts

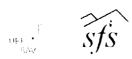
July 13 – 17, 2015 Stará Lesná, Slovakia

Joint Institute for Nuclear Research, Dubna
Institute of Experimental Physics SAS, Košice
Slovak Physical Society
University of Pavol Jozef Šafárik, Košice
Technical University, Košice
IFIN-HH, Bucharest, Romania

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Joint Institute for Nuclear Research, Dubna Institute of Experimental Physics SAS, Košice Slovak Physical Society University of Pavol Jozef Šafárik, Košice Technical University. Košice IFIN-HH, Bucharest, Romania

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SPINOR-LIKE HAMILTONIAN FOR MAXWELLIAN OPTICS¹

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BACKGROUND. Spinors are more special objects than tensor. Therefore possess more properties than the more generic objects such as tensors. Group of Lorentz two-spinors is the covering group of the Lorentz group.

PURPOSE. Since the Lorentz group is a symmetry group of Maxwell's equations, it is assumed to reasonable to use when writing the Maxwell equations Lorentz two-spinors and not tensors.

METHOD. We write the Maxwell equations using Lorentz two-spinors [1, 2]. Also used a convenient representation of Lorentz two-spinors in terms of the Riemann-Silberstein's complex vectors [3].

RESULTS. In the spinor formalism (in the representation of the Lorentz spinors and Riemann-Silberstein's vectors) we have constructed the Hamiltonian of Maxwellian optics. With the use of spinors Maxwell's equations take the form similar to the Dirac equation.

CONCLUSIONS. For Maxwell's equations in the Dirac-like form we can expand research methods at the expense of the methods of quantum field theory. In this form, clearly visible the connection between the Hamiltonians of geometric, beam and Maxwellian optics.

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