MATHEMATICAL MODELING AND COMPUTATIONAL PHYSICS

Book of Abstracts of the International Conference

Dubna, July 8–12, 2013

МАТЕМАТИЧЕСКОЕ МОДЕЛИРОВАНИЕ И ВЫЧИСЛИТЕЛЬНАЯ ФИЗИКА

Тезисы докладов международной конференции

Дубна, 8–12 июля 2013 г.

Organized by Joint Institute for Nuclear Research
Laboratory of Information Technologies,
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The book includes the abstracts of reports submitted to the International Conference «Mathematical Modeling and Computational Physics» (MMCP'2013). Full texts of the reports, refereed by the Conference Program Committee members, will be published separately.

В сборник включены аннотации докладов, представленных на международную конференцию «Математическое моделирование и вычислительная физика» (MMCP'2013). Полные тексты докладов, избранных программным комитетом конференции, будут опубликованы отдельно.

The international conference "Mathematical Modeling and Computational Physics – 2013" (MMCP'2013) continues the rich traditions of previous conferences on mathematical simulations, numerical methods and computational physics which were repeatedly organized in Dubna: "Computational Modeling and Computing in Physics" in 1996, "Modern Trends in Computational Physics" in 1998, "The V International Congress on Mathematical Modeling" in 2002, "Mathematical Modeling and Computational Physics" in 2006 (Slovakia), 2009 (Dubna), and 2011 (Slovakia).

The work of the Conference is organized on the following topics:
– distributed and parallel computing in science and technology;
– mathematical methods and tools for modeling complex systems;
– computational biophysics and chemistry, bioinformatics;
– mathematical methods and software for experimental data processing;
– computer algebra and quantum computing with applications.

The expected total number of the conference attendees will exceed 200 scientists from JINR, Russia, Armenia, Belarus, Bulgaria, Germany, Mongolia, Romania, Slovakia, Ukraine, Vietnam, etc.

The Conference information site http://mmcp2013.jinr.ru

Geometrization of electromagnetic waves

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In the problems of transformation optics have to solve extremely complex macroscopic Maxwell equations [1]. To simplify the calculations, instead of macroscopic Maxwell equations in the plane space-time is proposed to write vacuum Maxwell equations in curved space-time. For this tensor polarization magnetization geometrized in the sense of the field theory of gravity [2, 3]. As an implementation of this method calculates the lenses.

References

[1] M. Born and E. Wolf *Principles of Optics*, Cambridge University Press, Cambridge, 1999.
[2] A. A. Logunov *Relativistic Theory of Gravity*, Nova Science Publishers, 1998.
[3] J. Plebanski *Electromagnetic Waves in Gravitational Fields*, Phys. Rev. 118, 1396 (1960).