

**Журнал «Физическое образование в вузах»**  
**URL: <http://pinhe.lebedev.ru>**

**Совет журнала**

**Крохин Олег Николаевич** – проф., академик РАН, ФИАН, НИЯУ МИФИ, главный редактор  
**Гладун Анатолий Деомидович** – проф., МФТИ (ГУ), заместитель главного редактора  
**Калашников Николай Павлович** – проф., НИЯУ МИФИ, заместитель главного редактора  
**Рудой Юрий Григорьевич** – проф., РУДН  
**Шапочкин Михаил Борисович** – проф., Московское физическое общество, заместитель главного редактора  
**Колесников Юрий Леонидович** – проф., НИУ СПбИТМО (г. Санкт-Петербург)  
**Кудрявцев Николай Николаевич** – проф., МФТИ (ГУ), член-корреспондент РАН  
**Стриханов Михаил Николаевич** – проф., НИЯУ МИФИ  
**Сысоев Николай Николаевич** – проф., МГУ им. М.В. Ломоносова  
**Хохлов Дмитрий Ремович** – проф., МГУ им. М.В. Ломоносова, член-корреспондент РАН

**Редакционная коллегия**

**Голубева Ольга Наумовна** – проф., РУДН  
**Гороховатский Юрий Андреевич** – проф., РГПУ им. А.И. Герцена (г. Санкт-Петербург)  
**Завестовская Ирина Николаевна** – проф., ФИАН, НИЯУ МИФИ  
**Лебедев Владимир Сергеевич** – проф., ФИАН, МФТИ (ГУ)  
**Морозов Андрей Николаевич** – проф., НИУ МГТУ им. Н.Э. Баумана  
**Песоцкий Юрий Сергеевич** – проф., ассоциация «Марпут»  
**Пурышева Наталия Сергеевна** – проф., МПГУ  
**Салецкий Александр Михайлович** – проф., МГУ им. М.В. Ломоносова  
**Спирин Геннадий Георгиевич** – проф., МАИ  
**Стефанова Галина Павловна** – проф., АГУ (г. Астрахань)

**Ответственный секретарь**

**Канавин Андрей Павлович** – канд. физ.-мат. наук, НИЯУ МИФИ, ФИАН

**Техническая редакция**

**Алексеева Татьяна Валерьевна** – инженер по НТИ, ФИАН

**Physics in Higher Education**

**Vol. 25, № 1, 2019**

**The contents**

<b>5</b>	<b>Baroenergetic Equation of State: Direct Dynamic Derivation and Cosmological Application</b> Yu.G. Rudoy, O.I. Chekmareva
<b>17</b>	<b>Elementary Derivation of Maxwell's Equations</b> K.A. Tomilin
<b>36</b>	<b>Modelling of Body Motion in the Gravity Force Fields</b> V.F. Volkov, V.G. Pridanov
<b>55</b>	<b>Physics Institute of University of Konigsberg within the Framework of the Formation of the German Academic System</b> I.P. Korneva
<b>61</b>	<b>The Advancement of Natural-Science Education in Modern Engineering University</b> S.B. Pereslegin, A.A. Korolev, S.A. Kurashova
<b>74</b>	<b>Theory and Methods of Professional Education. Maxwell's Equations</b> I.V. Demidchenko, V.I. Demidchenko, G.N. Maslyueva, E.P. Kvyatosh
<b>86</b>	<b>The Model of the Interaction of Two Point Charges Moving Uniformly and Rectilinearly</b> V.S. Yunin
<b>96</b>	<b>Advanced Topics of Providing Continuation in Physics Education</b> O.Ya. Berezina, E.L. Kazakova, O.V. Sergeeva
<b>110</b>	<b>Experimental Study of Energy Laws in Electrostatics by Calorimetric Method</b> I.N. Fetisov
<b>119</b>	<b>Analysis of Errors of the High Schoolers on the Pass of Practical Part of the Preprofessional Examination</b> N.O. Martsenyuk, I.I. Vorotyntseva
<b>126</b>	<b>Formation of a System of Physical Concepts in the Conduct of Professionally Oriented Laboratory Experiment «Measurement of Illumination Using a Luxmeter»</b> E.A. Proskuryakova
<b>134</b>	<b>Study of Speed Distribution in the System of a Small Number of Particles</b> V.D. Negodin, A.V. Timofeev

# ***PHYSICS IN HIGHER EDUCATION***

## ***Founders of the Journal:***

Ministry of Education and Science of Russian Federation  
Moscow Physical Society  
International Association of Developers and Manufactures of Educational  
Technology  
The four-monthly journal  
ISSN 1609-3143

The journal is registered at the State Committee of the Russian Federation on the Press.  
Certificate of registration of the mass media no. 019360 dated November 2, 1999.

## **Journal Council**

**Oleg N. Krokhin** – Prof., Dr. Sci., Academician of the Russian Academy of Sciences, P.N. Lebedev Physical Institute of RAS, National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), (*Editor-in-Chief*)

**Anatoliy D. Gladun** – Prof., Dr. Sci., Moscow Institute of Physics and Technology (State University), (*Deputy Editor-in-Chief*)

**Nikolay P. Kalashnikov** – Prof., Dr. Sci., National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), (*Deputy Editor-in-Chief*)

**Yuriy G. Rudoy** – Prof., Dr. Sci., Russian People's Friendship University

**Mikhail B. Shapochkin** – Prof., Dr. Sci., Chairman of the Board of Moscow Physical Society, (*Deputy Editor-in-Chief*)

**Yuriy L. Kolesnikov** – Prof., Dr. Sci., St. Petersburg National Research University of Information Technologies, Mechanics & Optics

**Nikolay N. Kudryavtsev** – Prof., Dr. Sci., Moscow Institute of Physics and Technology (State University), Corresponding Member of Russian Academy of Sciences

**Mikhail N. Strikhanov** – Prof., Dr. Sci., National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

**Nikolay N. Sysoev** – Prof., Dr. Sci., Lomonosov Moscow State University

**Dmitry R. Khokhlov** – Prof., Dr. Sci., Lomonosov Moscow State University, Corresponding Member of Russian Academy of Sciences

## Editorial Board

**Olga N. Golubeva** — Prof., Dr. Sci., Russian People's Friendship University

**Yuriy A. Gorohovatskiy** — Prof., Dr. Sci., Herzen State Pedagogical University of Russia, St. Petersburg

**Irina N. Zavestovskaya** — Prof., Dr. Sci., P.N. Lebedev Physical Institute of RAS, National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

**Vladimir S. Lebedev** — Prof., Dr. Sci., P.N. Lebedev Physical Institute of RAS, Moscow Institute of Physics and Technology (State University)

**Andrey N. Morozov** — Prof., Dr. Sci., National Research Bauman Technical University

**Yuriy S. Pesotskiy** — Prof., Dr. Sci., Association «MARPUT»

**Natalia S. Puryшева** — Prof., Dr. Sci., Moscow Pedagogical State University

**Alexander M. Saleckiy** — Prof., Dr. Sci., Lomonosov Moscow State University

**Gennadiy G. Spirin** — Prof., Dr. Sci., Moscow Aviation Institute (National Research University)

**Galina P. Stefanova** — Prof., Dr. Sci., Astrakhan State University

## Executive Secretary

**Andrey P. Kanavin** — P.N. Lebedev Physical Institute of RAS, National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

## Technical Edition

**Tatyana Alekseeva** — engineer Publishing Service P.N. Lebedev Physical Institute of RAS

Phone: +7 (499) 132-64-11

E-mail: [kalachev@sci.lebedev.ru](mailto:kalachev@sci.lebedev.ru), [t.val.alekseeva@mail.ru](mailto:t.val.alekseeva@mail.ru)

Internet: [pinhe.lebedev.ru](http://pinhe.lebedev.ru)