## Vergeles S. Sergey


CONTACT INFORMATION

L.D. Landau Institute for Theoretical Physics of RAS
1a Akademica Semyonova str., Chernogolovka
Moscow region, Russia, 142432
Researcher

*Voice:* +7 (495) 7029317
*E-mail:* ssver@itp.ac.ru
WWW: www.itp.ac.ru/~ssver/

Department of Physics
National Research University Higher School of Economics
Myasnitskaya 20, Moscow, Russia, 101000
Lecturer


CITIZENSHIP

Russian Federation

SCIENCE INTERESTS

Nanooptics, fiber optics, vesicles and capsules, nonequlibrium statistical physics

PH.D.

L.D. Landau Institute for Theoretical Physics, RAS
entered: September 2005,
graduated: June 2008.
supervisor: Prof. Vladimir V. Lebedev
Topic: Rheological properties of vesicle suspension. (Ph.D. thesis text in Russian, PDF)

EDUCATION

**Moscow Institute of Physics and technology**, Dolgoprudniy, Moscow region, Russia

M.S., Theoretical physics (June 27th, 2005)

- Thesis Topic: Spatial dependence of passive scalar correlation functions in large scale chaotic velocity field for decay problem
- Advisor: Prof. Vladimir V. Lebedev
- Area of Study: Passive scalar advection in chaotic flows

TEACHING

NRU Higher school of economics

*lecturer* ***Sept.'17 up to date***
*at Department of physics in NRU HSE*

- Field theory (relativistic theory and electrodynamics), lecturer.

PUBLICATIONS

**Hydrodynamics**

- *Turbulent coherent flows*


[1] Nikolay A. Ivchenko and Sergey S. Vergeles. "Waves in a coherent two-dimensional flow", Physics of Fluids, vol. 33, p. 105102 (2021)

[2] Vladimir M. Parfenyev, Ivan A. Vointsev, Alyona O. Skoba, and Sergey S. Vergeles. "Velocity profiles of cyclones and anticyclones in a rotating turbulent flow", Physics of Fluids, vol. 33, p. 065117 (2021)

[3] A.B. Buzovkin, I.V. Kolokolov, V.V. Lebedev, S.S. Vergeles. "Coherent Vortex in Two-dimensional Turbulence Around a Rotating Disc", JETP Letters, vol. 111, No. 8, pp. 442–446 (2020)

[4] I.V. Kolokolov, L.L. Ogorodnikov, S.S. Vergeles. "Structure of coherent columnar vortices in three-dimensional rotating turbulent flow", Physical Review Fluids, vol. 5, p. 034604 (2020)

- *Excitation of vortex flow with surface waves*

[5] V.M. Parfenyev and S.S. Vergeles. "Large-scale vertical vorticity generated by two crossing surface waves", Physical Review Fluids, vol. 5, p. 094702 (2020)

[6] V.M. Parfenyev and S.S. Vergeles. "Formation and decay of eddy currents generated by crossed surface waves", Physical Review Fluids, vol. 4, p. 114701 (2019)

[7] V.M. Parfenyev and S.S. Vergeles. "Influence of a thin compressible insoluble liquid film on the eddy currents generated by interacting surface waves", Physical Review Fluids, vol. 3, p. 064702 (2018)

[8] V.M. Parfenyev, S.S. Vergeles, and V.V. Lebedev. "Effects of thin film and Stokes drift on the generation of vorticity by surface waves", Physical Review E, vol. 94, p. 052801 (2016)

[9] V.M. Parfenyev, S.S. Vergeles, and V.V. Lebedev. "Nonlinear Generation of Vorticity in Thin Smectic Films", JETP Letters, vol. 103, p. 201 (2016)

[10] S.V. Filatov, V.M. Parfenyev, S.S. Vergeles, M.Yu. Brazhnikov, A.A. Levchenko, and V.V. Lebedev. "Nonlinear Generation of Vorticity by Surface Waves", Physical Review Letters, vol. 116, p. 054501 (2016)

- *Particle and field advection by chaotic flow*

[11] Belan S., Chernykh A., Lebedev V., Vergeles S. "Confinement of inertial particles in the viscous boundary layer of a turbulent flow", JETP Letters, vol. 101, p. 12-16 (2015)

[12] S.S.Vergeles, "Spatial dependence of correlation functions in the decay problem for a passive scalar in a large-scale velocity field," Journal of Experimental and Theoretical Physics, vol. 102, pp. 685–701, 2006.

- *Soft particles motion in a flow*

[13] S.S. Vergeles and P.E. Vorobev, "Motion of near-spherical micro-capsule in planar external flow", JETP Letters **94**, pp. 17-21 (2011)

[14] S.S.Vergeles, "Rheological properties of a vesicle suspension", JETP Letters, vol. 87, p. 511, (2008)

[15] K. S. Turitsyn and S. S. Vergeles, "Wrinkling of vesicles during transient dynamics in elongational flow," Physical Review Letters, vol. 100, p. 028103, (2008)

[16] V. V. Lebedev, K. S. Turitsyn, and S. S. Vergeles, "Nearly spherical vesicles in an external flow", New Journal of Physics, vol. 10, p. 043044, (2008)

[17] V. V. Lebedev, K. S. Turitsyn, and S. S. Vergeles, "Dynamics of nearly spherical vesicles in an external flow," Physical Review Letters, vol. 100, p. 028103, (2007)

**Signal propagation along optical fiber**

- *Random signal in optical fiber*

[18] S. Derevyanko, A. Redyuk, S. Vergeles, and S. Turitsyn "Invited Article: Visualisation of extreme value events in optical communications", APL Photonics 3, p. 060801 (2018)

[19] L.L. Ogorodnikov, S.S. Vergeles. "Intensity statistics in a long random fiber Raman laser", Optics Letters, vol. 43(4), pp. 651-654 (2018)

[20] D.V. Churkin, I.V. Kolokolov, E.V. Podivilov, I.D. Vatnik, M.A. Nikulin, S.S. Vergeles, I.S. Terekhov, V.V. Lebedev, G. Falkovich, S.A. Babin and S.K. Turitsyn, "Wave kinetics of random fibre lasers", Nature Communications, vol. 6, p. 6214 (2015)

[21] Kolokolov I.V., Lebedev V.V., Podivilov E.V., Vergeles S.S. "Theory of a random fiber laser", ЖЭТФ, т. 146, с. 1295 (2014)

[22] S.S. Vergeles and K.S. Turitsyn, "Optical rogue waves in telecommunication data streams", Physical Review A, **83**, 061801(R) (2011)

• *Soliton regime of data transmission*

[23] Y.Chung, V.V.Lebedev, and S.S.Vergeles, "Radiation-induced interaction of optical solitons in fibers with randomly varying birefringence," Physical Review E, vol. 69, p. 046612, (2004)

[24] Y.Chung, V.V.Lebedev, and S.S.Vergeles, "Interaction of solitons through radiation in optical fibers with randomly varying birefringence", Optics Letters, vol. 29, p. 1245, (2004)

**Nanophotonics**

[25] S.S. Vergeles, A.K. Sarychev, and G.T. Tartakovsky. "All-dielectric light concentrator to subwavelength volume", Physical Review B, vol. 95, p. 085401 (2017)

[26] S. Belan, S. Vergeles and P. Vorobev, "Adjustable subwavelength localization in a hybrid plasmonic waveguide", Optics Express **21**, p. 7427 (2013)

• *Surface plasmon resonance in a thin gap between two closed metallic grains*

[27] V.Lebedev, S.Vergeles, and P.Vorobev, "Giant enhancement of electric field between two close metallic grains due to plasmonic resonance", Optics Letters **35**, 640-642 (2010)

[28] Vladimir V. Lebedev, Sergey S. Vergeles and Petr E. Vorobev, "Surface modes in metal–insulator composites with strong interaction of metal particles", Applied Physics B: Lasers and Optics, Vol. 111, pp. 577-588 (2013)

[29] V.E. Babicheva, S.S. Vergeles, P.E. Vorobev, and S. Burger "Localized surface plasmon modes in a system of two interacting metallic cylinders", Journal of the Optical Society of America B, Vol. 29, Issue 6, pp. 1263-1269 (2012)

[30] V.E. Babicheva, S.S. Vergeles, P.E. Vorobev and S. Burger, "Localized surface plasmon modes in a system of two interacting metallic cylinders", Journal of the Optical Society of America B, **29**, p. 1263 (2012)

[31] A. Ivanov, A. Shalygin, V. Lebedev, P. Vorobev, S. Vergeles and A.K. Sarychev, "Plasmonic extraordinary transmittance in array of metal nanorods", Applied Physics A **107**, pp. 17–21 (2012)

• *Theory of spaser*

[32] I. A. Fedorov, V.M. Parfenyev, S.S. Vergeles, G.T. Tartakovsky and A.K. Sarychev, "Allowable number of plasmons in nanoparticle ", Pis'ma v ZhETF, vol. 100, p. 591 (2014)

[33] V.M. Parfeniev and S.S. Vergeles "Quantum theory of a spaser-based nanolaser", Optics Express, vol. 22, p. 13671 (2014)

[34] V. M. Parfenyev and S. S. Vergeles, "Intensity-dependent frequency shift in surface plasmon amplification by stimulated emission of radiation", Physical Review A **86**, p. 043824 (2012)

## Conference proceedings

Surface plasmon modes in a metallic nanocylinder array, S.S. Vergeles, V.V. Lebedev and P.E. Vorobev. In *Nonlinesr Photonics'11*, St.-Petersburg, Russia, August 24 - 26, 2011

Surface plasmon propagation in a metalic nanocylinder array, S.S. Vergeles, V.V. Lebedev and P.E. Vorobev. In *Days on Diffraction'2011*, St.-Petersburg, Russia, May 30 - June 3, 2011

"Influence of thermal fluctuations on phase diagram of vesicle dynamical regimes in planar external flow", S.S. Vergeles, V.V. Lebedev and K.S. Tiritsyn, In *Softflow 2009. Complex- and bio- fluids*, Cargèse, Corsica Island (France).

"Rheological properties of vesicular suspension ", Landau-Weizmann Workshop on theoretical physics November 9-11 2008, Weizmann Institute.

"Vesicle dynamics in external flows", Workshop and Visiting Programme of researchers from Forschungszentrum Juelich at partner research organisations in Moscow, Presidium of RAS, 24.09. - 29.09.2007

"Wrinkling of membrane in transient vesicle dynamics", international workshop "Turbulence and mixing", November 3 - 8, 2007, Orchid Hotel, Eilat, Israel

"Interaction of solitons via radiation in optical fibers with randomly varying birefringence", Russian conference "Russian seminar on fibre lasers", Novosibirsk, 4-6 april 2007,

Warwick Turbulence Simposium, Graduate School and Workshop on Instabilities and Turbulence in MHD flows, University of Warwick, June 26 – July 1, 2006, "Lorenz force statistics in kinematic dynamo at high Reynolds number"