

Curriculum Vitae

Dmitry V. Naumov, Doctor of Science (Physics and Mathematics)



Education

Irkutsk State University, Master degree — 1997

JINR, PhD — 2001

JINR, Doctor of Sciences - 2017

In more details:

1992-1997 Irkutsk State University, Department of Radiophysics and Electronics and Department of Theoretical Physics

Academic year research works

1996-1997 *Diploma thesis* “Nuclear Fusion from Molecular States and Electron Screening in Nuclear Reactions”.

2001 PhD thesis “*Strange Particles Production and Measurement of Lambda and Lambda-bar polarization in neutrino interactions in the NOMAD experiment at CERN*”.

2017 Doctor of sciences “Measurement of θ_{13} , Δm^2_{32} , and covariant quantum field theory of neutrino oscillations”.

Scientific Carrier

1. Deputy director of DLNP JINR (2013-2023)
2. Head of scientific sector at DLNP JINR (2006–2013)
3. Foreign researcher at INFN (Italy, 2004–2006)
4. Foreign researcher at LAPP, IN2P3 (France, 2002–2003)
5. Young researcher at DLNP JINR (1997–2002)

Also, a **member** of

6. The working group of “Russian Neutrino Program”
7. The scientific council of JINR.
8. The scientific council of DLNP JINR.
9. Editorial Committee of PEPAN Letters
10. JUNO Executive Board

Principal Investigator of

11. JINR Neutrino Program from 2013
12. Daya Bay project at JINR from 2006
13. JUNO project at JINR from 2013
14. RSF, RFBR grants

Chairman and organiser of

15. Baikal School on physics of elementary particles and astrophysics (from 2004)
16. Baksan School on astrophysics and cosmology (2019)
17. Kamchatka School on physics of elementary particles and astrophysics (2019)

Professional Experience

in experimental physics

Member of

1. NOMAD Collaboration
 - a. Identification of strange hadrons, reconstruction,
 - b. data analyses of Lambda and Lambda-bar polarization,
 - c. strange particle production cross-section measurement,
 - d. theory of spin transfer in lepton-nucleon and in hadron interactions,
 - e. paper writings
 - f. supervising undergraduate and PhD students.
2. EUSO/JEM-EUSO Collaborations
 - a. Modelling of neutrino/hadrons interactions, cosmic rays interactions and light propagation in both atmosphere and matter
 - b. Leading a team developing Euso Simulation and Analysis Software (ESAF)
 - c. paper writings
 - d. Supervising undergraduate and PhD students.
3. OPERA Collaboration
 - a. Developing simulation and reconstruction software
 - b. Supervising undergraduate and PhD students.
4. Daya Bay Collaboration (Breakthrough in Fundamental Physics Prize 2016, European Physical Society Prize 2023)
 - a. From the very beginning of the experiment. Simulation of various proposals of muon veto detector
 - b. Oscillation analysis (2016 Daya Bay paper based on JINR's analysis)
 - c. Paper review and writing
 - d. Reactor antineutrino spectra measurement
 - e. Sterile neutrino search
 - f. Supervising undergraduate and PhD students.
 - g. Leading JINR group (JINR PI)
 - h. Executive Board Member

5. JUNO Collaboration
 - a. Leading JINR group (JINR PI) to provide a major hardware and software contribution of the group: High Voltage Units (25 thousands), Top Tracker detector, Scanning Stations for massive tests of large PMTs, Computing resources (3000 CPU units, etc), simulation and reconstruction software etc
 - b. Paper review
 - c. Paper writing
 - d. Supervising undergraduate and PhD students.
 - e. Idea and Development of Global Neutrino Analysis software (JINR neutrino fitter) — a fast, scalable statistical analysis tool used elsewhere
 - f. Executive Board Member
 - g. Publication Committee Member
6. Baikal-GVD Collaboration
 - a. Promotion of the experiment at various levels
 - b. Leading the simulation group (more than 10 people)
 - c. Development of ntsim simulation package able to simulation interactions and propagation of neutrino, muon, and any other particle, produce and transport light, PMT response simulation
 - d. Paper writing
 - e. Paper review
 - f. Supervising undergraduate and PhD students.

Experience in theoretical physics

1. Theory of coherent and incoherent neutrino-nucleus neutral-current scattering.
2. A wave packet model of neutrino oscillations within the quantum field theory. New observables predicted, some tested against data.
3. Calculations of spin transfer function to (anti) hyperons in deep inelastic scattering of charged leptons and (anti)neutrino off nucleons
4. Calculation of electron screening effects for nuclear reactions in the Sun's plasma
5. Phenomenology within Nambu-Jona-Lasinio model

Skills

- **Theory:** Quantum Field Theory, Few Body Systems Methods, Quantum Mechanics, Cosmology
- **Data Analysis:** from detector hits to estimates of fundamental parameters
- **Computing:** Monte Carlo and Numerical Methods, C++, python, Fortran, awk, perl, Linux/Unix/macOS, databases, git, dockers, etc. Development of large scale projects
- **Leadership:** Small and large scale teams leadership with always healthy atmosphere, dedication and enthusiasm
- **Teaching:** lecturing a wide range of subjects both in experimental and theoretical

physics, supervising undergraduate, postdocs

- **Science popularization:** books, articles, video, interviews, exhibitions, equipment creation etc

Teaching and supervising

1. Lecture course at Moscow State University: "Quantum Field Theory" (20 years of experience)
2. Lecture courses and lectures at numerous international and Russian schools
3. Textbook: "Quantum Field Theory for Experimentalists (and Beyond)" (500+ pages)
4. Supervision of student projects (20+)
5. Supervision of PhD dissertations (4)

Reviewer

1. ZhETP
2. EPJ C
3. Papan, Papan Letters

Scientific interests

1. Neutrino physics: interactions, oscillations, astrophysical sources, neutrino Nature, etc
2. Astrophysics and cosmic rays physics
3. Physics of Elementary Particles, Standard Model and Beyond
4. Cosmology

Publication activity

- More than 150 papers.
- H-index = 47

Major papers:

1. Extraction of the ^{235}U and ^{239}Pu Antineutrino Spectra at Daya Bay Daya Bay Collaboration (D. Adey (Beijing, Inst. High Energy Phys.) et al.). Apr 16, 2019. 7 pp. Published in Phys.Rev.Lett. 123 (2019) no.11, 111801
2. Coherency and incoherency in neutrino-nucleus elastic and inelastic scattering Vadim A. Bednyakov, Dmitry V. Naumov (Dubna, JINR). Jun 22, 2018. 27 pp. Published in Phys.Rev. D98 (2018) no.5, 053004

3. Measurement of electron antineutrino oscillation based on 1230 days of operation of the Daya Bay experiment Daya Bay Collaboration (Feng Peng An (East China U. Sci. Tech.) et al.). Oct 15, 2016. 46 pp. Published in Phys.Rev. D95 (2017) no.7, 072006
4. Study of the wave packet treatment of neutrino oscillation at Daya Bay Daya Bay Collaboration (Feng Peng An (East China U. Sci. Tech.) et al.). Aug 4, 2016. 20 pp. Published in Eur.Phys.J. C77 (2017) no.9, 606
5. Improved Measurement of the Reactor Antineutrino Flux and Spectrum at Daya Bay Daya Bay Collaboration (Feng Peng An (East China U. Sci. Tech.) et al.). Jul 18, 2016. 36 pp. Published in Chin.Phys. C41 (2017) no.1, 013002 DOI: 10.1088/1674-1137/41/1/013002
6. A Diagrammatic treatment of neutrino oscillations D.V. Naumov (Dubna, JINR), V.A. Naumov(Dubna, JINR) (Aug, 2010) Published in: J.Phys.G 37 (2010) 105014

Books

1. Textbook: "Quantum Field Theory for Experimentalists (and Beyond)". 2023 (available online and to be published)
2. A sci-pop book "Sun and solar neutrino". AVANTA 2023

Science popularisation

1. Film scenarios, science popularization videos, cartoons.
2. Popular science articles.
3. Interviews with various media.
4. Interviewer.
5. Science Branch.
6. Blog "Baikal Diary 2019".
7. Video clips "Neutrino Hunters". Recipient of the RAS Prize for Best Science Popularization Works 2020.
8. Popular science book "Sun and Solar Neutrinos" (to be published by "AVANTA", 2023).

Awards

1. European Physical Society Prize: 2023 (Daya Bay)
2. DLNP JINR prizes: 2016, 2006, 2004, 2001
3. JINR prizes: 2012, 2001 (Daya Bay, NOMAD)
4. The Breakthrough Prize in Fundamental Physics: 2015 (Daya Bay)
5. AYSS JINR prize: 1997
6. ISU prize: 1997

Personal Information

- Born July 12, 1975. Married. Two children.
- Spoken languages: Russian, English, Italian, French (+little German)