CURRICULUM VITAE

Vadim A. Naumov

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Date of birth: **February 20, 1954**
Place of birth: **Tomsk, Russia**
Citizenship: **Russia**
Nationality: **Jew**
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PERMANENT ADDRESS FOR CORRESPONDENCE

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FORMATION

1961–1969: Normal secondary school, Kemerovo City.

1969–1971: Physico-Electrotechnical Lyceum under the Kemerovo Pedagogical Institute and Extra-mural Physico-Mathematical Lyceum under the Novosibirsk State University.

1971–1976: Tomsk State University, Department of Theoretical Physics (1971–1974) and Department of Quantum Electrodynamics & Field Theory (1975–1976); Moscow State University (Dubna branch), Blokhintsev's Department of Theoretical Nuclear Physics (1974–1975).

- **Academic year research works**
  - *"Superluminal Velocities in Special Relativity"* (1973)[1],
  - *"Goldstone Mechanism in Nonrelativistic Quantum Mechanics"* (1974),
  - *"Indefinite Metrics in Quantum Electrodynamics"* (1975).
- **Diploma of Physicist** (July, 1976)
  - Title of the Master Thesis: *"Nucleon Compton Effect within a Current Algebra Based Model with Hard Pions"*.
  - Thesis Advisor: **Prof. G. M. Radutsky (Research Institute for Nuclear Physics, Tomsk Polytechnic Institute, Tomsk).**

1979–1980: **Moscow State University, Dubna branch, Faculty for Improvement of Skill for Higher School Lecturers in Physics.**

1980–1984: **Institute for Nuclear Research (INR) of the Academy of Sciences of the USSR (Moscow), Extra-mural postgraduate studentship.**

Nov. 1988: **Candidate of Phys. & Math. Sci. (PhD) in field of Physics of Atomic Nucleus and Elementary Particles (INR, Moscow).**

- Title of the PhD Thesis: *"Low Energy Neutrinos and Cosmic Rays"*.
- Thesis Advisor: **Prof. G. V. Domogatsky (INR, Moscow).**

June 1999: **Degree of Senior Scientific Researcher in field of Theoretical Physics.**

PROFESSIONAL POSITIONS

- **Junior researcher of the Lab for High Energy Physics, Research Institute for Nuclear Physics, Tomsk Polytechnic Institute** (December 1975 – June 1976).
- **Assistant Lecturer, Lecturer and then Senior Lecturer of the Department of Theoretical Physics, Irkutsk State University** (October 1976 – March 1992).
- **Researcher and then Senior Scientific Researcher of the Group for Theoretical Physics, Institute of Applied Physics (IAP), Irkutsk State University** (January 1981 – January 1989).
- **Research Leader of the Group for Cosmic Rays and Neutrino Astrophysics, IAP, Irkutsk State University** (January 1981 – January 1989).
- **Head of the Lab of Theoretical Physics, IAP, Irkutsk State University** (January 1989 – October 1999).

[1] The second premium at the "Regional Contest of Under- and Postgraduate Research Works", Tomsk State University, May, 1973.

- **Senior Scientific Researcher at the National Institute for Nuclear Physics (INFN), Florence branch, Florence, Italy** (March 1992 – October 1996).
- **Research Leader of the IAP, Irkutsk State University** (current, since October 1999).
- **Associate Professor of the Department of Theoretical Physics, Irkutsk State University** (current, since November 1999).

TEACHING EXPERIENCE

1976–1978: **Foundation course on** Physics **at the Physico-Mathematical Lyceum attached to Irkutsk State University.**

1976–1992: **Undergraduate & graduate courses and practical training at Physics Faculty of Irkutsk State University:**

- **Higher Mathematics:**
  - Linear Algebra and Analytic Geometry,
  - Differential and Integral Equations (Analytic and Numerical Methods),
  - Calculus of Variations;
- **Theoretical Physics:**
  - Nonrelativistic Quantum Mechanics,
  - Relativistic Quantum Mechanics,
  - Thermodynamics and Statistical Physics,
  - Quantum Theory of Many-Particle Systems (Part I: Bosons),
  - Classical Theory of Radiation,
  - Quantum Field Theory,
- **Special Subjects:**
  - Current Algebras in Particle Physics,
  - Particle Physics Phenomenology,
  - Cosmic Ray Physics (Part I: Nuclear Aspect),
  - Neutrino Astrophysics.

1981–1992: **Guidance of a regular Physics Seminar for the teaching staff of the Department of Theoretical Physics, Irkutsk University (basic items:** Topological and Algebraic Methods in Physics, Advanced Quantum Mechanics, Particle Physics, Neutrino Astrophysics).

1992–1996: **Graduate lectures on** Selected Topics of Astroparticle Physics **at Dipartimento di Fisica, Università degli Studi di Firenze, Florence, Italy.**

1996–2000: **Graduate courses at Physics Faculty of Irkutsk State University:**

- **Theoretical Physics:**
    - Physical Kinetics,
    - Particle Transport Theory,
- **Special Subjects:**
    - Particle Physics Phenomenology,
    - Cosmic Ray Physics and Neutrino Astronomy.

- **Two educational supplies on** Problems in Thermodynamics and Statistical Physics **(in collaboration with S. I. Sinegovsky, Irkutsk University Press, 1978, 1979).**

- **Scientific guidance at Irkutsk and Florence Universities (11 academical-year works, 12 master theses, and 2 PhD theses).**

EXTENDED SCIENTIFIC VISITS

- **Scientific visitor at the Lab for Theoretical Physics, Joint Institute for Nuclear Research (JINR), Dubna** (September 1979 – March 1980).

- **Scientific visitor at the Institute for Nuclear Research of the USSR Academy of Sciences, Moscow/Troitsk** (3 to 4 months per year during the period January 1981 to March 1992).

- **Scientific visitor at the National Lab for High Energy Physics, KEK, Tsukuba and invited professor at Physics Department of Niigata University** (November – December, 1991).

- **Scientific visitor at the PPE Division of CERN, Geneva** (April – May, 1995).

- **Scientific visitor at INFN, Sezione di Firenze, Florence** (1 to 2 months per year from 1996).

- **Invited professor at Korea Institute for Advanced Study (KIAS), Seoul** (November – December, 1998).

PARTICIPATION IN INTERNATIONAL COLLABORATIONS

- **BAIKAL NT Collaboration** (1981–1992)
- **NESTOR Collaboration** (since 1992)
- **L3+COSMICS Collaboration** (since 1996)
- **AIRWATCH FROM SPACE Collaboration** (since 1998)

FIELDS OF CURRENT ACTIVITY

- **Neutrino Astrophysics, Cosmic Ray Physics, Particle Transport Theory:**
  - Neutrino oscillations in matter, solar and atmospheric neutrinos;
  - Cosmic-ray muon and neutrino production and propagation through matter;
  - Nuclear-cascade process in the atmosphere and geomagnetic effects of cosmic rays;
  - Physics of large-volume underground/water Cherenkov detectors.
- **Particle Physics Phenomenology:**
  - Topological phases in quantum physics;
  - CP violation in quark and lepton sectors of the Standard Model;
  - Charmed particle hadroproduction;
  - Radiative and weak decays of hadrons;
  - Interactions of leptons and SUSY particles with matter.
- **Applied Mathematics and Programming**[2]**:**
  - Numerical methods for solution of differential, integral and integro-differential equations;
  - Quadrature and cubature algorithms;
  - Spline function methods.

[2] Computer skills: VAX/VMS, MS-DOS, Windows 3.1 to 98, Windows NT. Basic programming language: Fortran (including Microsoft Fortran PowerStation and Digital Visual Fortran for Alpha workstations). Master some CERNLIB packages and many Windows applications.

MAIN SCIENTIFIC RESULTS

- **Adiabatic theory of neutrino oscillations in inhomogeneous media** (effects from electro-weak radiative corrections and CP violation in the leptonic sector, strict conditions to the nonlocal resonance in topological phases for three-neutrino oscillations in inhomogeneous media).
- **Upper limit for the density of supersymmetric relativistic dark matter** (massive photinos) **in the Universe from the data of underground neutrino detectors.**
- **Semi-analytic methods to solve the transport equations for high-energy muon and neutrino propagation through dense and homogeneous media.**
- **Semi-analytic methods for calculating energy spectra and spatial distributions of the cosmic-ray secondaries, including leptons, at low, intermediate, high, and super-high energies** (taking account for scaling violation in hadron-nucleus interactions, energy losses, geomagnetic and meteorological effects, muon depolarization, $K_{\ell 3}$ form factors, etc).
- **Calculation of the atmospheric neutrino flux at low energies and neutrino induced event rates in underground detectors.**
- **Evaluation of "prompt" muon and neutrino fluxes at high energies within the recombination quark-parton model and quark-gluon string model for charm hadroproduction.**

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