

Yuri A. Kamyshev

Professor, Department of Physics and Astronomy, University of Tennessee
505 Nielsen Physics Building, 1408 Circle Drive, Knoxville, TN 37996-1200
Office: 865-974-6777; Fax: 865-974-7843; kamyshev@utk.edu

Education: Graduated in 1970 from Moscow Institute of Physics and Technology (MPTI), Department of General and Applied Physics. Received Ph.D. in 1978 in Physics and Mathematics (Nuclear and Particle Physics) from the Institute of Theoretical and Experimental Physics (ITEP) in Moscow (adviser Prof. V.A. Lyubimov).

Employment:

1999 – present Professor, Dept. of Physics and Astronomy, University of Tennessee, Knoxville, TN.

1991 – 1999 Research Professor, Joint employee of the University of Tennessee and ORNL/Physics.

1969 – 1991 Employee of the Institute for Theoretical and Experimental Physics (ITEP) of the Ministry of Atomic Energy and Industry, Moscow, Russia; latest position: leading senior scientist.

Research activities:

1969 – 1976 Measurement of neutron total cross section on protons and nuclei, n - p charge-exchange, n - p elastic scattering, and neutron diffractive dissociation on protons at Serpukhov PS in the range 10-70 GeV. Diffractive and Regge Physics. Contributed to electronics, calorimetry, data analysis.

1974 – 1982 Very small-angle neutron scattering experiment (NA-6) and direct photon production search experiment (NA-24) at CERN. Diffractive and QCD physics. Contributed to detector hardware development and design, electronics, simulations and data analysis.

1982 – 1991 Contributed to the construction and commissioning of 300-ton depleted uranium gas hadronic calorimeter for L3 experiment at CERN LEP collider. U-Calorimeter in L3 was performing well with $\pm 5\%$ initially calibrated response from the day one of LEP and was one of the most reliable and best understood subdetectors in L3. Contributed in the detector R&D, design, beam tests, calibration, electronics, data analysis, construction and commissioning of the calorimeter. At the same time also managed an effort of R&D group at ITEP/Moscow for the study and development of several calorimetric techniques for high-energy hadron colliders.

1991 – 1993 Collaborator on L* that later became GEM/SSC experiment. Spokesmen of L* Liquid Scintillator Calorimetry R&D Program. Spokesman of the GEM Calorimeter Subsystem Group; member of GEM executive committee. SSC project was terminated by US Government in 1993.

1994 – 1998 Participation in SLD Collaboration at SLAC: development of tungsten quartz-fiber polarization detector; measurement of left-right asymmetry with polarized electrons.

1994 – present Development of the idea of new experimental search for neutron-antineutron transformation with free neutrons. Organizer and co-organizer of International Workshop on “Search for Baryon and Lepton number violation” at LBL Berkeley in September 2007, in Gatlinburg in September 2011 and several others. Participating in the effort of a new European Collaboration that plans to search for neutron to antineutron transformation at the European Spallation Source and build this experiment.

1997 – 2008 Collaborator of the international US-Japan KamLAND Collaboration and PI of UT group in KamLAND. KamLAND detector is in operation since January 2002. Contributed to the development of readout electronics, old 20-inch PMT refurbishment, PMT and HV commissioning, data interpretation, simulations and analysis. Contributed to KamLAND scintillator response non-linearity measurements and understanding radiopurity issues of KamLAND scintillator. Proposed the search for neutron disappearance in the KamLAND detector later performed and published by the KamLAND Collaboration. In November 2015 KamLAND experiment received a Breakthrough Prize in Fundamental Physics.

2004 – 2014 Collaborator of the International Brazil-France-Germany-Italy-Japan-Russia-Spain-US Collaboration “Double Chooz” pursuing θ_{13} measurement with reactor antineutrinos at Chooz/France

power plant. PI of UT Double Chooz group. Member of the group in Collaboration that is responsible for the design, construction, test, and commissioning of the PMT subsystem and of the electronics group. First results of Double Chooz Collaboration were reported in November 2011 at the International Conference and are submitted for publication to PRL in January 2012. Results of Double Chooz experiment were outperformed in 2013 by more sophisticated “Daya Bay” experiment of US-China Collaboration.

2008 – 2015 Collaborator on NOvA neutrino long-base-line experiment at Fermilab. Member of detector calibration group. Studies of NOvA scintillator re-emission and response linearity measurements.

2011 – present Member of UT/SNS Cold Spallation Target ORU group developing conceptual design of new experiments with neutrons for ESS in Europe and for SNS at Oak Ridge.

Selected publications: [complete list](#) of over 300 publications can be found at [inSPIRE](#) website. Following list of several publications provides a view on subset of research activities:

1. A. Arefev et al. (L3 Collaboration), “A Detailed Study of the Performance of the Uranium Gas Sampling Calorimeter,” Nucl. Instr. Meth. **A 285**, 403 (1989).
2. [P. Alivisatos et al.](#), KamLAND: A liquid scintillator anti-neutrino detector at the Kamioka site, STANFORD-HEP-98-03, RCNS-98-15, July 1998.
3. [F. Ardellier et al.](#), “Double Chooz: A Search for the Neutrino Mixing Angle θ_{13} ”, Double Chooz Collaboration Proposal, arXiv: hep-ex/0606025, June 20, 2006.
4. [K. Eguchi et al.](#), (*KamLAND Collaboration*), First results from KamLAND: evidence for reactor anti-neutrino disappearance, Phys. Rev. Lett. **90**:021802, 2003.
5. [T. Araki et al.](#), (*KamLAND Collaboration*), “Measurement of neutrino oscillation with KamLAND: Evidence of spectral distortion,” Phys. Rev. Lett. **94**:081801, 2005.
6. [K. Eguchi et al.](#) (*KamLAND Collaboration*), A high sensitivity search for $\bar{\nu}_e$ ’s from the sun and other sources at KamLAND, Phys. Rev. Lett. **92**:071301, 2004.
7. [T. Araki et al.](#), (*KamLAND Collaboration*), Search for the invisible decay of a neutron with KamLAND, Phys.Rev.Lett.96 (2006) 101802,2006.
8. [Y. Abe et al.](#) (DOUBLE-CHOOZ Collaboration), “Indication for the disappearance of reactor electron antineutrinos in the Double Chooz experiment,” arXiv:1112.6353 [hep-ex].
9. B.O. Kerbikov et al, “Damping and Decoherence in Neutron Oscillations”, [asXiv:1512.03398](#)
10. D.G. Phillips, et al., “Neutron-Antineutron Oscillations: Theoretical Status and Experimental Prospects”, accepted for publication in Physics Reports, [arXiv:1410.1100](#)
11. Yu. Kamyshev and E. Kolbe, Signatures of nucleon disappearance in large underground detectors, Phys.Rev.D67:076007, 2003.
12. [Y. Kamyshev](#), “Neutron antineutron oscillations,” 2002, arXiv:hep-ex/0211006.

Current Research Interests:

Development of new techniques for detection of neutron appearance and disappearance transformation. Nucleon decay search in DUNE project. Development of new techniques for Light-Dark-Matter detection. Development of new neutron-antineutron transformation search experiment at European Spallation Source. Collaboration with scientists in Europe, India and Japan. Neutron sources based on the spallation target. Accelerator-driven subcritical reactors (ADS) with Th fuel.

Detector topics: nonlinearity of liquid scintillators in low energy range; water-based liquid scintillators; ; photo-detectors: Si-diodes and PMTs; detectors for low recoil energy detection (dark matter); cold and ultra-cold neutron detectors; detectors for antineutrons; moderation of neutrons to cryogenic temperatures; high- m neutron super mirrors; diamond nanoparticle reflectors, shielding of Earth magnetic field down to nT level.

Related Professional Activities:

American Physics Society

Security clearances:

US-citizen; no security clearance