

# Curriculum Vitae

Oleg Shalaev

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Note: the last version of this document is available on  
<http://quantumtheory.physik.unibas.ch/shalaev/cv.html>  
Availability: 04/16/2014.

## Contact information

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## Personality

I am not an outstanding programmer<sup>1</sup> and/or system administrator – many people would beat me in that. However, it is not easy to find someone who can solve a problem from the very beginning until the end better than me, namely: (a) formalize the problem, (b) invent the algorithm(s), (c) program the code and test it, and (d) write the report and make a presentation.

Next, I believe that there is no knowledge that I would be unable to understand. I do not trust statements which I can not demonstrate myself, no matter how influential is the person who makes them. In particular, I do not trust books, and from time to time find errors in them.

Ready to relocate: I have done it 5 times during the last 15 years, for a total distance of 9920 miles, and more or less got used to it.

## Employment history

- 04/15/2013-present: post-doctoral researcher at the [University of Rochester \(NY\)](#).  
Supervisor: Hanan Dery <[hanan.dery@rochester.edu](mailto:hanan.dery@rochester.edu)>  
[525 Computer Studies Bldg., P.O. BOX 270231, 14627-0231 Rochester NY, USA.](#)  
☎585-275-3870.
- 08/20/2012-03/29/2013: post-doctoral researcher at [CSUN](#).  
Supervisor: Nicholas Kioussis <[nick.kioussis@csun.edu](mailto:nick.kioussis@csun.edu)>

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<sup>1</sup>Sometimes I have a feeling of being top professional in programming; this happens, for example, when I see recruiting websites unable to distinguish a “physicist” from “physician” or “physical therapy” ☹.

Live Oak Hall, CSUN, 18111 Nordhoff Street, Northridge, CA 91330, USA.  
☎818-677-7733.

- 12/01/2008-08/15/2012: post-doctoral researcher at the [University of Missouri](#).  
Supervisor: Giovanni Vignale <[vignaleg@missouri.edu](mailto:vignaleg@missouri.edu)>  
[223 Physics Bldg., University of Missouri, Columbia, MO 65211-7010, USA.](#)  
☎573-882-3670.
- 11/01/2003-11/30/2008: post-doctoral researcher at the [University of Basel \(Switzerland\)](#).  
Supervisor: Daniel Loss <[daniel.loss@unibas.ch](mailto:daniel.loss@unibas.ch)>  
[University of Basel, Klingelbergstrasse 82, CH-4056 Basel, Switzerland.](#)  
☎+41-61-267-3750.

## Education

- 1998 M.S. in Physics with Distinction, [St. Petersburg Technical University](#): “Transport properties of HTSC: evidence of  $T_c$  -inhomogeneity”.
- 2003 Ph.D. in Physics at [SISSA](#): “Nonequilibrium persistent currents in mesoscopic disordered systems”.

## General skills

- **Work style:** many people are proud to be experts in software XXX and computer language YYY; many job advertisements require such proficiency. From my point of view software proficiency is somewhat secondary: I always learned the necessary software and computer languages fast when I needed them. For me the hardest part of a problem is to *develop* an appropriate algorithm; its programming is just a routine.<sup>2</sup> When I work alone, I have a freedom of choosing the optimal (free) software which is the most convenient for the particular problem. Sometimes within the one problem I use completely different software systems which interact with each other (for example, [maxima](#), C++ and [gnuplot](#)).
- **Eager to learn:** during the last three years I learned several topics in physics: (i) inverse scattering theory, (ii) quantum relaxation, and (iii) group theory (see my physics CV). Somewhat less important for my work was the knowledge of linux, SQL, LISP, C++, [maxima](#), [perl](#) which I also learned myself. Finally, certain things I learn just because an opportunity comes, even if they appear to be useless at the moment. For example, I learned **Italian** and **German** because I lived in Italy and Switzerland, and no one has ever payed me for being able to speak these languages.
- **Good in calculations:** Experienced in doing analytical (by hand and using CAS [maxima](#)) and numerical ([maxima](#), C++ with [LAPACK](#) and [QUADPACK](#) libraries) calculations.
- **Creative, algorithm developer:** As a scientist I often do the things which have never been done before, or, in other words, I love innovations. I like to invent my own, new approaches to

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<sup>2</sup>This is the reason why I am puzzled by many job advertisements which pay so much attention to programming skills.

problems; one could check the validity of this last statement by looking on my articles (see [http://arxiv.org/find/cond-mat/1/au:+Chalaev\\_O/0/1/0/all/0/1](http://arxiv.org/find/cond-mat/1/au:+Chalaev_O/0/1/0/all/0/1)), where I utilize several very different physical/mathematical techniques, enumerated in my physics CV (see the next section).

- **Good in mathematics and numerical methods:** In my University I had great luck with the **mathematics teacher**. In total I passed 8 exams on linear algebra, complex analysis, topological and metric spaces, manifolds, general theory of integrals (including Lebesgue measure), and probability theory based on Kolmogorov axioms. On every examination I had to demonstrate several (randomly chosen from the course) theorems (sometimes – only one if the proof was really long) without the help of books, notes and friends. Much of this knowledge is sleeping, but can be woken up fast: e.g., now I have to remember grounds of differential geometry (curved spaces, connections, Christoffel symbols – see <http://quantumtheory.physik.unibas.ch/shalaev/geometry.pdf>) and I do it fast even though I have never used differential geometry during the last 18 years.

Also we had a very decent course on numerical methods: linear algebra, interpolation, integration, differential equations. All the methods were derived analytically with estimates of speed and accuracy.

## Physics background

My physics expertise is described by the following **PACS codes**: 02.30.Zz, 02.40.-k, 61.50.Ah, 71.20.Mq, 71.20.Nr, 71.70.Ej, 72.70.+m, 73.23.-b, 73.23.Ra.

You might want to take a look on my articles (see [http://arxiv.org/find/cond-mat/1/au:+Chalaev\\_O/0/1/0/all/0/1](http://arxiv.org/find/cond-mat/1/au:+Chalaev_O/0/1/0/all/0/1)) and/or download the CV where I advertise my physics skills (see <http://quantumtheory.physik.unibas.ch/shalaev/cv.pdf>).

## Programming skills

- I learn computer languages fast.
- **GNU/Linux:** very advanced (12 years of experience). Abandoned Windows in 1999, see <https://linuxcounter.net/user/310541.html>
- **Large data sets:** had experience in dealing with about 90.000.000 files; for that I had to recompile the linux kernel with the Reiserfs4 support.
- **SQL: PostgreSQL** – used it for personal needs: wrote a perl-script (using PERL DBI) which accumulates data for all NYSE listings on my PC. The data is downloaded using free Yahoo-finance web service and is stored in my local PostgreSQL database. This summer (06/25/2012 and 06/29/2012) I have passed two SQL tests which made me self-confident enough to claim that I am quite good in it (at least with Postgre SQL).
- **html** – basic (without java and php), just wrote my personal web site, see <http://quantumtheory.physik.unibas.ch/shalaev/>

- **CAS:** *maxima* – very advanced user (wrote in total 267300 lines and 15016877 symbols of code), *Mathematica* – was a very advanced user before I have abandoned it 6 years ago.<sup>3</sup> However, in the end of May I had to rewrite an (approx. one-page) *maxima* program in *Mathematica* and realized that I recover my *Mathematica* experience fast.
- **LISP:** I used it just a couple of times; For example, when I published my *large program* for dealing (generating, selecting and calculating) with Feynman diagrams, I decided to write comments in both English and Russian. For convenience I wrote a LISP-function for the *emacs* editor which shows comments only in the desired language. Despite the fact that I had no previous LISP experience, this did not take much time because *maxima* (which I know really well) is based on LISP.
- **Python:** The Python test which I did 06/29/2012 demonstrated me that Python is quite similar to *maxima* (see above), so I passed the test quickly despite the absence of the previous Python experience.
- **C++:** good in scientific programming (LAPACK, multithreading with OpenMP), see an example at <http://quantumtheory.physik.unibas.ch/shalaev/kp.tar.bz2>
- **bash, sed, awk, emacs** – advanced level; **perl** – wrote several middle-basic level scripts (in total 4152 lines and 144293 symbols of code).
- **LaTeX:** very advanced level (this CV has also been written in LaTeX). Often my programs generate automatic human readable reports using the following chain: C++ and/or *maxima* → *gnuplot* → LaTeX → PDF.
- **Cluster computation:** openMP + OpenMPI + ganglia.

## Other skills and general life experience

Hobbies: linux, German, *OSM*, table tennis.

I lived in **Russia, Italy, Switzerland, Missouri and California**; I met many people of different (sometimes – exotic) cultural backgrounds / nationalities. Apart from English, I speak/read/write **Russian** and **Italian** fluently. I also fluently speak **German**, but make mistakes in declensions. Recently I have passed the exam for the B1 German certificate, see below.

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<sup>3</sup>Before I stopped using *Mathematica*, I wrote a sophisticated program for manipulating Feynmann diagrams. Then there was a software upgrade in the University of Basel, and I discovered that (i) my program does not work in the new *Mathematica* version, (ii) I need several weeks in order to correct that, and (iii) it is impossible to get the old version back. For me this was the last straw (I knew before that *Mathematica* sometimes makes errors in integration and Taylor expansion), and I decided to invest my time in learning similar free software (*maxima*).

# GOETHE-ZERTIFIKAT B1 ZERTIFIKAT DEUTSCH ZEUGNIS

A1 A2 B1 B2 C1 C2

Name - Surname  
Shalaev

Geburtsdatum - Date of birth  
16.07.1975

Prüfungstermin - Date of exam  
12.02.2013

Vorname - First Name  
Oleg

Geburtsort - Place of birth  
St. Petersburg, Russland

Prüfungsort - Place of exam  
Los Angeles, CA

## Ergebnis - RESULT:

erreichte/maximale Punktzahl - achieved/maximum score

LESEVERSTEHEN · READING COMPREHENSION  
SPRACHBAUSTEINE · LANGUAGE ELEMENTS  
HÖRVERSTEHEN · LISTENING COMPREHENSION  
SCHRIFTLICHER AUSDRUCK · WRITTEN EXPRESSION  
MÜNDLICHE PRÜFUNG · ORAL TEST

70,00 / 75  
27,00 / 30  
70,00 / 75  
42,00 / 45  
61,00 / 75

INSGESAMT · TOTAL

270,00 / 300

PRÄDIKAT · GRADE

sehr gut · very good

Ort/Date  
New York, 25.02.2013

Prüfungskommission  
Examination Committee

Prüfungsort  
Place/Date

01-495-B1-00226-13  
Number - Number

  
Konstantin Bunnik  
GOETHE-INSTITUT

