

## Curriculum Vitae

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### ANDRIY LYAKHOV

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USA

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### EDUCATION

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#### PhD

Nov 2003 – Nov 2007

BASEL UNIVERSITY

PhD (*magna cum laude*) in theoretical physics in the group of Prof. Dr. Christoph Bruder

#### Higher Education

Sep 1999 – Oct 2003

CHERNIVTSI NATIONAL UNIVERSITY (Ukraine), Physics Department

**Master of Science in Physics** (*cum laude*)

Grade Point Average: 5.0 (1=lowest, 5=highest)

*(I have studied 5<sup>th</sup> year courses in summer/september and passed examinations in October to start my PhD half a year earlier, since there was an open spot in Basel for that time)*

#### Second Higher Education

Sep 1999 – Oct 2003

CHERNIVTSI NATIONAL UNIVERSITY (Ukraine), Physics Department

**Master of Science in Computer Systems and Networks** (*cum laude*)

Grade Point Average 4.97 (1=lowest, 5=highest)

#### Secondary school

Sep 1993 – May 1999

SECONDARY SCHOOL (Gymnasium), Chernivtsi (Ukraine). Graduated with gold medal and honour degree (*cum laude*).

### WORK AND TEACHING EXPERIENCE

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Feb 2009 – till now

Research in the laboratory of Prof. Artem Oganov, Stony Brook University

- Co-lecturer in the graduate courses “*Topics in Mineralogy and Crystallography: Electronic Structure of Materials*”, “*Crystalline Solids*” and “*Structure and Properties of Materials*”

Aug 2007 – Jan 2009

Research in the group of Prof. Artem Oganov, ETHZ, Switzerland

Nov 2004 – Jun 2007

Practical courses at the Basel University

- *Mathematical physics, Quantum mechanics, Superconductivity, Physics I, Electrodynamics, Thermodynamics*

Sep 1999 – May 2003

Informatics courses in Gymnasium N1 for children of 9-11<sup>th</sup> grades

- *Teached problem solving and algorithmisation*
- *Many of the students become winners of the city (27 diplomas), regional (16 diplomas) and Ukraine (2 diplomas) competitions in informatics*

Feb 2002, Feb 2003                      Scientific tutor of the regional team in the Ukrainian Young Physicists Tournament and Ukrainian Young Programmer Tournament

- *in 2003 our team won the first place in this competition*

Sep 2001 – May 2002                      Teacher of informatics in the Regional Boarding School for Orphans

## **EXTRACURRICULAR ACTIVITIES**

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Feb 2001 – Aug 2004                      Head of the regional office of youth organization “Young Democrats” (“young” branch of the Democratic Party of Ukraine)

2000 – 2004                                  Participant and prizewinner in the ukrainian intellectual games competitions

Oct 1999                                        Bronze medal in XI International Olympiad in Informatics in Turkey

1995 – 1998                                  Winner of the city (12 diplomas) and regional (9 diplomas) olympiads in chemistry, physics, informatics and mathematics

1997, 1998                                    Winner of the All-Ukrainian olympiad in informatics

## **COMPUTER SKILLS**

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Good knowledge in programming (Pascal, Delphi, C++, Matlab, Visual Basic, VBA, Java-Script, some PHP), computer networks, applied mathematics and algorithmisation. Some knowledge in computer engineering. MS Office (Word, Access, PowerPoint, Excel). Basic knowledge of MySQL.

## **LANGUAGES**

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**English**                      fluent (C1-C2 level of Common European Framework of Reference for Languages)

**German**                      satisfactory (reading: C1, speaking: B1-B2 level of Common European Framework of Reference for Languages).

**Russian**                      Native language

**Ukrainian**                    Native language

## **PUBLICATIONS**

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Wen X.-D., Hand L., Labet V., Yang T., Hoffmann R., Ashcroft N. W., Oganov A. R., Lyakhov A. O. (2011) **Graphanes: Sheets and stacking under pressure.** PNAS, in press.

Oganov A.R., Lyakhov A.O., Valle M. (2011). **How evolutionary crystal structure prediction works, and why.** Acc. Chem. Res. **44**, 227-237

Lyakhov A.O., Oganov A.R., Valle M.  
**Crystal structure prediction using evolutionary approach**  
Chapter in: "Modern Methods of Crystal Structure Prediction", Berlin: Wiley-VCH, (2010).

Oganov A.R., Ma Y., Lyakhov A.O., Valle M., Gatti C. (2010).  
**Evolutionary crystal structure prediction and novel high-pressure phases.**

In “High-Pressure Crystallography: From Fundamental Phenomena to Technological Applications”, Proceedings of the NATO Advanced Study Institute on High-Pressure Crystallography: Advanced Armor Materials and Protection from Explosives, Erice, Italy, 4–14 June 2009.

Lyakhov A.O., Oganov A.R., Valle M.

**How to predict very large and complex crystal structures**

Comp. Phys. Comm. **181**, 1623–1632 (2010)

Oganov A.R., Lyakhov A.O.

**Towards the theory of hardness of materials**

J. Superhard Mater., Vol. 32, **3**, 143–147 (2010)

Oganov A.R., Ma Y.M., Lyakhov A.O., Valle M., Gatti C.

**Evolutionary Crystal Structure Prediction as a Method for the Discovery of Minerals and Materials**

Reviews in Mineralogy and Geochemistry, vol. 71, 271-298 (2010)

Oganov A.R., Ma Y.M., Xu Y., Errea I., Bergara A., Lyakhov A.O.

**Exotic behavior and crystal structures of calcium under pressure**

PNAS, vol. 107, **17**, 7646-7651 (2010)

Gao G., Oganov A.R., Li P., Li Z., Wang H., Cui T., Ma Y., Bergara A., Lyakhov A.O., Iitaka T., Zou G.

**High-pressure crystal structures and superconductivity of Stannane (SnH<sub>4</sub>)**

PNAS, vol. 107, **4**, 1317-1320 (2010)

Zurek E., Hoffmann R., Ashcroft N. W., Oganov A.R., Lyakhov A.O.

**A little bit of lithium does a lot for hydrogen**

PNAS, vol. 106, **42**, 17640-17643 (2009)

Hu C. H., Oganov A.R., Lyakhov A.O., Zhou H. Y., Hafner J.

**Insulating states of LiBeH<sub>3</sub> under extreme compression**

Phys. Rev. B **79**, 134116 (2009)

Ma Y., Eremets M.I., Oganov A.R., Xie Y., Trojan I., Medvedev S., Lyakhov A.O., Valle M., Prakapenka V.

**Transparent dense sodium**

Nature **458**, 182-185, (2009)

Martinez-Canales M., Oganov A.R., Lyakhov A.O., Ma Y., Bergara A.

**Novel Structures and Superconductivity of Silane under Pressure**

Phys. Rev. Lett. 102, 087005. (2009)

Hu C.H., Oganov A.R., Wang Y.M., Zhou H.Y., Lyakhov A., Hafner J.

**Crystal structure prediction of LiBeH<sub>3</sub> using ab initio total-energy calculations and evolutionary simulations**

J. Chem. Phys. 129, art. 234105. (2008)

Ono S., Oganov A., Brodholt J.P., Vocadlo L., Wood I.G., Lyakhov A., Glass C.W., Côté A.S., Price G.D.

**High-pressure phase transformations of FeS: novel phases at conditions of planetary cores.**

Earth Planet. Sci. Lett. 272, 481-487, (2008).

Lyakhov A.O., Braun D., Bruder C.

**Role of interference in quantum state transfer through spin chains**

Phys. Rev. A **76**, 022321 (2007)

Lyakhov A.O. and C. Bruder C.

**Use of dynamical coupling for improved quantum state transfer**

Phys. Rev. B **74**, 235303 (2006)

Lyakhov A. and Bruder C.

**Quantum state transfer in arrays of flux qubits**

New J. Phys. **7**, 181, (2005)

Lyakhov A.O., Mishchenko E.G.

**Thermal conductivity of a two-dimensional electron gas with Coulomb interaction**

Phys. Rev. B **67**, R041304 (2003).

Gritsuyk B.N., Lyakhov A.A., Mel' nichuk S.V., and Strebezhev V.N.

**Semiconductor Compound Thin Films Obtained with Capillary Evaporators**

Technical Physics, Vol. 46, No. 9, 2001, pp. 1121–1124.