

Marek Matas

Curriculum Vitae

ETH Zurich • Materials Theory

Department of Materials • Wolfgang-Pauli-Strasse 27 Zurich • Switzerland

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Educational and Work Background

Bachelor's degree in Physical Engineering and Material Science	2010-14
Master's degree in Particle Physics, graduated with honors	2014-16
PhD in Theoretical Particle Physics and Quantum Chromodynamics	2016-20
Postdoctoral position at ETH, Zürich aimed for Dark Matter searches	2020-**

Study Abroad

- Alexander von Humboldt gymnasium, Lauterbach, Germany
- Union College, Schenectady NY, USA
(Studied nanostructures, Polymeric Physics and Complex Analysis)

Language Skills

- Czech (native)
- English (C2)
- German (C1)
- Spanish (B2)
- French (B2)
- Russian (B2)

Programming Skills

- C++
- Python
- R
- C#
- SQL
- Javascript

Theses

BSc Thesis, *Diffusion processes of NiTi blend layers deposited by cold spray technology*

Advisor: Ing. Jan Cizek, PhD. cizek@fme.vutbr.cz, +420 54114 3166

- Researched the possibility of manufacturing high quality NiTi intermetallic thin layers by the cold spray technology and annealing for its excellent mechanical and biocompatible behavior.

MSc Thesis, *Study of saturation effects in hadrons using Balitsky-Kovchegov evolution equation*

Advisor: Ing. Jan Cepila, PhD. Jan.Cepila@cern.ch, +420 22435 8356

- Studied the parton behavior in high energy hadrons which is described by the Balitsky-Kovchegov evolution equation. I used Python, R and C++ to develop a method for solving the equation to obtain QCD-based predictions for the LHC.

PhD Thesis, *Phenomenological studies of QCD at high energies*

Advisor: prof. Jesús Guillermo Contreras Nuno, PhD. jesus.guillermo.contreras.nuno@cern.ch, +420 22435 8266

- Contributed to Quantum Chromodynamics with the use of computationally driven models that describe the dynamics of nucleons and nuclei from first principles of quantum field theories.

Academic Achievements

Becquerel prize

2020

- I won the Becquerel prize in the year 2020 for the best doctoral research in nuclear sciences in the Czech Republic. This prize is organized by EDF, ATMEA and the French Embassy and is for all students of all Czech universities.

Josef Hlávka prize

2020

- I won the Josef Hlávka prize in the year 2020 for an outstanding research carried out during my doctoral studies. This prize is awarded to young researchers that have shown exceptional abilities and creativity in their field of science.

Conference CSSVK7

2016

- Took the first place in the category "Theoretical Physics" for a talk on Saturation phenomenon and Geometrical Scaling in gluon distributions.

Scholarships for excellent academic performance

2016

- I was granted a scholarship for excellent academic performance for three consecutive years.

Talks Presented at International Conferences and Meetings

- **LightCone (Paris, FR)**– *Impact parameter dependence of collinearly improved Balitsky-Kovchegov evolution* 2019
- **Low-x (Nicosia, CY)** – *Collinearly improved Balitsky-Kovchegov evolution* 2019
- **DIS19 (Torino, IT)** – *Collinearly improved impact-parameter dependent Balitsky-Kovchegov evolution* 2019
- **DIS18 (Kobe, JP)** – *Forward di-jets in p+A collisions in the ITMD framework* 2018
- **POETIC6 (Paris, FR)** – *Numerical stability of the BK evolution solutions* 2016
- **Ecole Joliot Curie (Montpellier, FR)** – *ITMD framework for di-jet production* 2018
- **ECT* QCD School (Trento, IT)** – *Forward di-jet production* 2018
- **Ecole Polytechnique seminar (Paris, FR)**– *Transverse momentum distributions and their factorization* 2017
- **HERAEUS (Bad Honnef, DE)** – *Di-jet correlations and its significance for the search for saturation effects* 2017
- **CERN Atlas Physics meeting (Geneva, CH)** – *Forward di-jet production as a probe of saturation effects* 2017
- **CERN FCC meeting (Geneva, CH)** – *Magnetic field induced calorimeter granularity* 2016
- **KU group meeting (Lawrence, USA)** – *Collinearly improved Balitsky-Kovchegov evolution* 2019
- **Workshop on Forward Physics and QCD (Guanajuato, MX)** – *Collinearly improved BK evolution* 2019
- **Invited talk at a seminar (Santiago de Compostella, ES)** – *b-dependent Balitsky-Kovchegov evolution* 2020

Total No. = 14

Local Meetings and Seminars

- **UPC workshop (Decin, CZ)** – *Parton-like properties of hadrons in diffractive events* 2019
- **CSSVK7 (Prague, CZ)** – *Study of the Dipole Scattering Amplitude* 2016
- **CFRJS19 (Prague, CZ)** – *Coulomb tails suppression in the collinearly improved low-x evolution* 2019
- **JuveMatter (Trinec, CZ)** – *Cold sprayed Ni-Ti layers and their significance for biocompatibility* 2013
- **WEJCF19 (Bily Potok, CZ)** – *Electron Ion Collider and deep inelastic scattering* 2019
- **UPC workshop (Decin, CZ)** – *Geometric scaling properties of vector mesons in diffractive production* 2018
- **WEJCF18 (Bily Potok, CZ)** – *Transverse momentum distributions and their factorization properties* 2018
- **Physics Seminar (Prague, CZ)** – *Saturation searches in dilute-dense collisions* 2017
- **WEJCF17 (Bily Potok, CZ)** – *Forward di-jet production as a probe of saturation effects* 2017
- **CFRJS (Prague, CZ)** – *Forward di-jet production in dilute-dense collisions at the LHC* 2017
- **Young Minds Meeting (Prague, CZ)** – *Future Circular Collider and its impact on particle physics* 2016
- **WEJCF16 (Bily Potok, CZ)** – *Numerical solutions to the running-coupling Balitsky-Kovchegov equation* 2016

Total No. = 12

List of Publications

Attached in a separate file.

IT Achievements

- CERN Hackaton** 2016
 - Won the hackaton, that is held annually at CERN for its employees. Developed a game for Android devices that promotes Particle Physics with location-based particle collection and collider building.
- Mozilla Festival** 2016
 - Since I was the one to present the winning app of the annual Hackaton, I was sent to London to the Mozilla Festival to represent CERN and introduce this project to the community of the festival.
- EO ClimLab Hackaton** 2017
 - Took second place in the EO Vation hackaton supported by the European Space Organisation (ESA) with application that uses satellite data and image processing to locate *Emiliana huxleyi* – a phytoplankton, that consumes CO₂ and stores it in the form of CaCO₃.

Work Experience

- Data processing at Shaffer library** 2013
- Worked at the Shaffer library in Schenectady, USA with library databases. Used SQL and MS Access to filter, unify and check large amount of data that the department was getting to process.
- Union College department of Physics** 2014
- Worked in the laboratories of the department of physics. Set up new experiments and improved the old ones with a special focus on interferometry. The main interest was in the Mossbauer experiment and cosmic muon detection.
- Ataccama – Big Data solutions** 2016
- Joined a software company specialized on the Big Data Solutions. We used Hadoop Spark and Hive as a tool for managing large datasets.
- CERN – Summer Student Internship** 2016
- Helped developing a new detector for the new 100-km accelerator that is planned to be built in Switzerland in the year 2040-50, the biggest machine of its sort that mankind has ever built.
- Thermodynamics course** 2017
- I was chosen to teach the Thermodynamics course, for the students of the first year. This course covers the basics of the mathematics behind entropy, thermodynamical potentials and Maxwell's statistical approach to gases.

Other Achievements

- MRKEV detector** 2015
- Built a scintillator-based cosmic-muon detector with two arms and a coincidence trigger for educational purposes.
- Expedition to China by land** 2013
- Planned and organized a trip to china, only by land (hitchhiking, bus, train etc.) which took over 40 days. Six articles came out in the Czech newspaper covering this journey.

Hobbies and Interests

- Jazz-Funk band "The Closing Date"** 2017
- Played the guitar in a jazz-funk band. Prior to that, I sang in an accapella for two years and performed in Ethno-orchestra at music festivals in Slovenia, Portugal, Croatia and Germany.
- Theatre play – Semantics of the Storm** 2010-17
- Wrote a theatre play "Semantics of the Storm", that I published on Amazon and in local publishing enterprises.
- Prace v Digitalu – Web Application** 2019
- Developed a javascript based web application for offering job positions to specific groups that are missed by generic portals such as LinkedIn and others.