Dr. Xiaoguang Dong May 10, 2020
Max Planck Institute for Intelligent Systems
123 Pleasant Lane
Tübingen, Germany

Dear Dr. Xiaoguang Dong,

I am a master's student in physics at the University of Innsbruck and I am about to complete my studies in May.

In my master's studies, I mainly focused on quantum information and quantum optics, but I also kept an interdisciplinary approach to physics, taking courses in continuum mechanics, active matter and machine learning. More specifically, as part of the active matter course, I developed a simulation of the Vicsek model to study swarming behaviour.

During the last year, I focused on machine learning models applied to quantum physics and quantum information processing by joining Hans Briegel's group for my master's thesis. I worked on the Projective Simulation model (`https://projectivesimulation.org/`), a physics-inspired framework developed for AI applications. The goal of my thesis is combining this framework with typical neural network architectures and applying it to quantum mechanical problems. More specifically, I developed a reinforcement learning environment for quantum circuits, where an intelligent agent, by interacting with the environment, aims at constructing different types of quantum states and gates. The agent makes use of feedforward neural networks and recurrent networks to achieve its goal.

My actual goal is to continue doing research connected to physics and machine learning, e.g. by pursuing a PhD. In-between, I would like to acquire some additional knowledge in machine learning-related simulations. In this perspective, this internship would be a good opportunity for me to acquire further knowledge in the field.

Thank you in advance for your consideration.

Sincerely yours,

Francesco Preti

Attached: curriculum vitæ

Francesco Preti
fraz. Piazzola 173 – 38020 Rabbi (TN), Italy
+43 660 6478038 • ☎ +39 0463 985114
✉ franz3105@gmail.com, francesco.preti@student.uibk.ac.at

Francesco Preti

Curriculum Vitae

"Natura semina scientiæ nobis dedit, scientiam non dedit" - Seneca

Education

2017–2020 **Masters of Science, Physics**, *University of Innsbruck*, Innsbruck, Austria.
Specialized in Quantum Physics

2014–2017 **Bachelor of Science, Physics**, *University of Innsbruck*, Innsbruck, Austria, *Overall grade – 1.2*.
Specialized in Quantum Physics

Masters Thesis

Title *Deep Projective Simulation and State Preparation*

Supervisors Prof. Dr. Hans J. Briegel

Description In this thesis I adress the possibility of performing quantum circuit design with (deep) reinforcement learning methods.

Experience

Aug 2019– Oct 2019 **Summer Intern**, Bosch, Vienna.
Software development - Tool development departement

Oct 2018 – Jan 2019 **Teaching Assistant**, University of Innsbruck, Innsbruck.
Teaching assistant in Mathematical Methods for Physics II

Oct 2016 – Jan 2017 **Teaching Assistant**, University of Innsbruck, Innsbruck.
Teaching assistant in Theoretical Physics I

Awards

2016, 2017 Performance-based scholarship - University of Innsbruck

Computer skills

Basic C, julia, matlab

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Intermediate	C++, Git, LaTeX, Mathematica, Linux
Advanced	PYTHON, Machine Learning

Other Activities

Jul 2016	**Summer school on Ultracold atoms**, *Innsbruck, Austria*.
17 – 21 Sep 2018	**QML, Quantum machine learning conference**, *Innsbruck, Austria*.
23 Feb 2018	**PLANKS Physics competition**, *Trento, Italy*.
Feb 2019	**Google Hash Code 2019**, *Innsbruck, Austria*.
Mar 04–08, 2019	**ESGI, European study group with industry**, *Innsbruck, Austria*.
Feb 10–20, 2020	**Winter school Machine Learning in Physics**, *Vienna, Austria*.

Languages

Italian	**Mothertongue**
English	**Advanced**
German	**Advanced**

Interests

- Writing
- Politics
- Running
- Economy

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