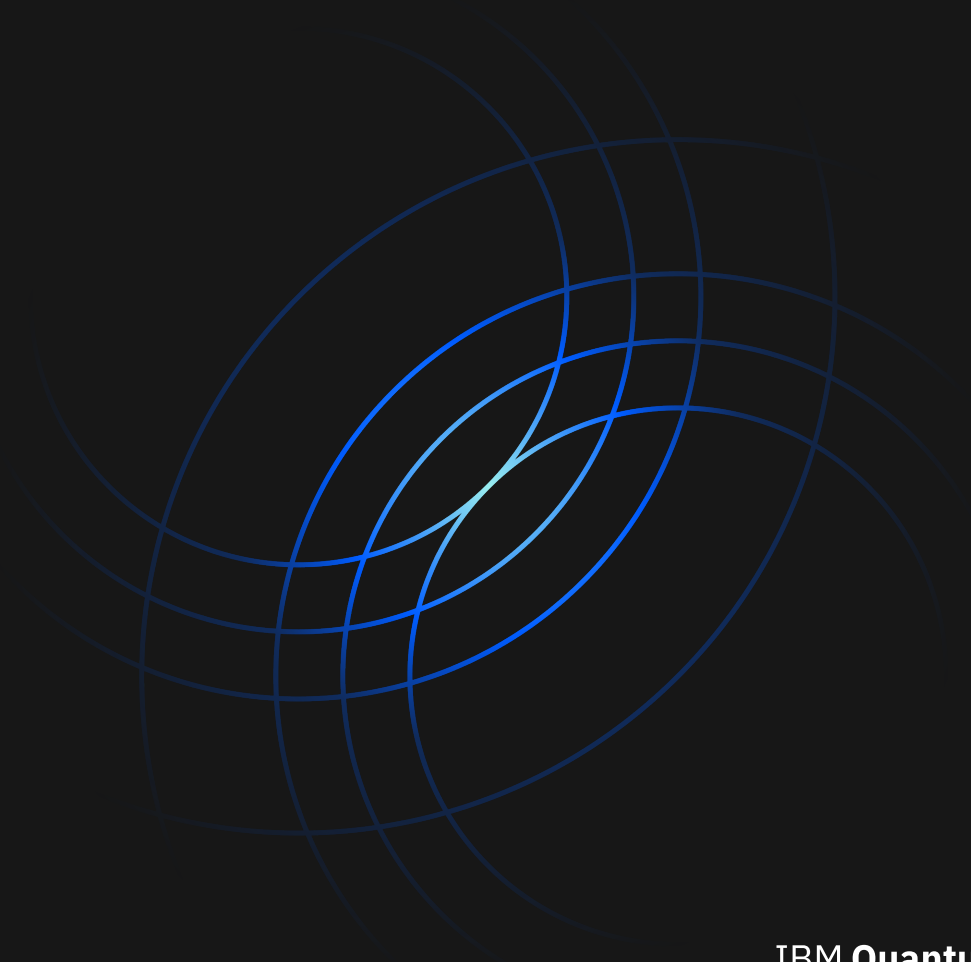


IBM Quantum Resources for Self-Learning

Dr Sieglinde Pfaendler
IBM Quantum Researchers Program Lead



Materials are available for different learning goals.

Futurists and Leaders

- Imagine Future Usecases and Applications

Fun and Games

- Learn quantum concepts in an intuitive way

Educators

- Prepare lesson plans and courses
- Content Resource
- Share

Beginners and Learners

- Fundamental Concepts
- Professional Certification and Qiskit Advocates

Advanced Users and Developers

- Troubleshooting
- Learning
- Contributing

Resources for Self-Learning: Agenda

IBM Quantum

1

Qiskit.org & Textbook

2

Tutorials &
Documentation

3

YouTube & Forums

4

Other Resources for
different types of news
and information

Resources: Self-learning

[IBM Quantum Tools](#)

Cloud applications for programming real quantum hardware and quantum circuit simulators

- [IBM Quantum Composer](#)
- [IBM Quantum Lab](#)
- [OpenQASM](#)
- [IBM Cloud](#) – (Where larger systems available as Pay-as-you go option)

Qiskit.org and Qiskit Textbook

- [Qiskit.org](#)
- [Qiskit Textbook](#) - Interactive online advanced text on quantum algorithms and computation based on Qiskit

Qiskit Documentation & Certifications

- [Qiskit Documentation](#)
- [IBM Quantum for Developers](#)
- [Developer Certificate Syllabus](#)
- [Developer Certificate Details](#)

YouTube Channels

[IBM Research on YouTube](#)

- [Quantum Computing Playlist](#) -

[Qiskit YouTube Channel](#)

- [Qiskit Foundations](#) – Coding with Qiskit Season 1
- [Qiskit Algorithms](#) – Coding with Qiskit Season 2
- [Qiskit Live](#) – livestream of public lecture series
- [SuperPosition series](#) – explores how individuals became Qiskit developers
- [1 Minute Qiskit](#) – Qiskit tips and tricks

Resources: Web, Social Media and Blogs

IBM Quantum

Articles on new Features, Advancements, and Accomplishments

- [Qiskit on Medium](#)
- [IBM Quantum Blog](#)
- [IBM Research Blog](#)
- [IBM Research Europe](#)

Key Information about IBM Quantum

- [IBM Quantum Hardware Roadmap](#)
- [IBM Quantum Development Roadmap](#)
- [IBM Quantum](#)

Announcements

- [Qiskit on Twitter](#)
- [Jay Gambetta on Twitter](#)
- [IBM Research on Twitter](#)
- [IBM Quantum LinkedIn](#)

Help Forums

- [Qiskit on Slack](#)
#qiskit-101
#qiskit-dev
#ibm-quantum-systems
#ibm-quantum-platform
...and many interest channels
- [Qiskit on GitHub](#)
- [Quantum computing on Stack Exchange](#)
- [Stack Overflow – Qiskit tag](#)

Performing Quantum Computing Experiments in the Cloud

Simon J. Devitt
Center for Emergent Matter Science, RIKEN, Wako, Saitama 351-0198, Japan.
(Date: September 2, 2016)

Quantum computing has attracted considerable interest from both experimental and theoretical physicists. With the rapid progress of quantum information science, it becomes more and more

Experimental test of Mermin inequalities on a five-qubit quantum computer

David Ahn and José Ignacio Latorre
Departament d'Àlgebra i Geometria, Universitat de Barcelona, Diagonal 645, 08028 Barcelona, Spain
and Institut de Ciències de la Computació (IC3), Universitat de Barcelona, 08035 Barcelona, Spain
(Received 25 May 2016; published 11 July 2016)

Violation of Mermin inequalities is a direct test of the five-qubit IBM quantum computer. For two,

Experimental Comparison of Two Quantum Computing Architectures

N. M. Linke, D. Maslov, M. Rosticher, S. Debnath, C. Figgitt, K. A. Landsman, K. Wight, and C. Monroe^{1,2,3}
¹Joint Quantum Institute and Department of Physics,

Compressed quantum computation using the IBM Quantum Experience

M. Hebenstreit, D. Ahn, J. I. Latorre, and B. Kraus¹
¹Institute for Theoretical Physics, University of Innsbruck,
²Dept. Física Quàntica i Astrofísica, Universitat de Barcelona, Diagonal
³Institut de Ciències del Cosmos, Universitat de Barcelona, Diagonal

ProjectQ: An Open Source Software Framework for Quantum Computing

Daniel S. Steiger, Thomas Hoyer, and Matthias Troyer
Institute for Theoretical Physics, ETH Zurich, 8093 Zurich, Switzerland
(Date: December 26, 2016)

We introduce ProjectQ, an open source compiler framework and simulator with execution capabilities. We introduce our Python-based example implementation of quantum algorithms through circuit and back-end connecting to the IBM Quantum Experience. Our framework can provide plug-in strategies.

Quintuple: a Python 5-qubit quantum computer simulator to facilitate cloud quantum computing

Christine Corbett Moran^{1,2,3}

¹NSF AAMP California Institute of Technology, TAPIR, 1207 E. California Blvd., Pasadena, CA 91125
²University of Chicago, 5516 S.P. Winterwood, Ardenwood-South Pole Station, Ardenwood

A quantum teleportation experiment for undergraduate students

S. Fedorchenko
Laboratoire Matériaux et Phénomènes Quantiques, Sorbonne Paris Cité,
Université Paris Diderot, CNRS UMR 7162, 75113, Paris, France

With the rapid progress of quantum information science, it becomes more and more

Homomorphic Encryption Experiments on IBM's Cloud Quantum Computing Platform

Bo-Liang Huang, Yoo-Wi Zuo, Tin Li, Feng-Guang Li, Yu-Tao Dai, Xiang-Qun Fu, Shao Zhang, Xiang Wang, and Wan-Su Bao^{1,2}
¹Key Laboratory of Quantum Information and Quantum Physics,
²Center for Quantum Information and Quantum Physics,
of China, Hefei, Anhui 230026, China
and Microscale and Department of Modern Physics,

Demonstration of entanglement assisted invariance on IBM's Quantum Experience

Sebastian Deffner
Department of Physics, University of Maryland Baltimore County, Baltimore, MD 21250, USA

New Journal of Physics

The open access journal at the forefront of physics

PAPER

Entropic uncertainty and measurement reversibility

Mario Berta, Stephanie Wehner, and Mark Wilde^{1,2}

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²IBM University of Technology, Los Angeles, CA 90029, USA, The N
stitute for Theoretical Physics, Department of Physics and Astron
omy, Santa Barbara, CA 93106, USA
Date any correspondence should be addressed.

O Computador Quântico da IBM e o IBM Quantum

Experience

IBM Quantum Computer and the IBM Quantum Expi

Alon C. Santos¹

de Física, Universidade Federal Fluminense, Niterói, Rio de Ja

Quantum state reconstruction made easy: a direct method for tomography

R. P. Rundle, Todd Tilma, J. H. Samson, and M. J. Everitt¹
¹Quantum Systems Engineering Research Group & Department of Physics,
Loughborough University, Leicestershire LE11 3TU, United Kingdom
²Tokyo Institute of Technology, 8-18-1 Ohokayama, Meguro-ku, Tokyo 158-8501, Japan

Approximate Quantum Adders with Genetic Algorithms: An IBM Quantum Experience

Rui Li¹, Unai Alvarez-Rodriguez², Lucas Lamata², and Enrique Solano^{2,3}

¹Department of Physics, Zhejiang University, Hangzhou 310027, China
²Department of Physical Chemistry, University of the Basque Country UPV/EHU, Apartado 644, 48940 Leioa, Spain
³IKERBASQUE, Basque Foundation for Science, Maria Diaz de Haro 3, 48013 Bilbao, Spain

state space. Known and new properties, any system, like the first 100000. It should be Experience the Wigner (GHE) and contrast

Quantum Computing Books by IBM Authors

IBM Quantum



Quantum Computing Books by IBM Authors

IBM Quantum



Resources for Self-Learning

1

Qiskit.org & Textbook

- Different views & Interactive learning
- Past Summer Courses
- Syllabus

2

Tutorials & Documentation

- Qiskit text book
- Qiskit Documentation (Application Modules)
- IBM Quantum-Computing Platform

3

YouTube & Forums

- Qiskit Youtube and subchannels
- IBM Research
- Help forums available in different platforms, such as slack, Github, Stack Exchange

4

Other Resources

- Blogs
 - Qiskit on Medium
 - IBM Research
- Social media accounts
- Journals & Books
- Developer Certificate/Qiskit advocates

IBM Quantum



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