

Quantum Computing for Track Reconstruction at LHCb

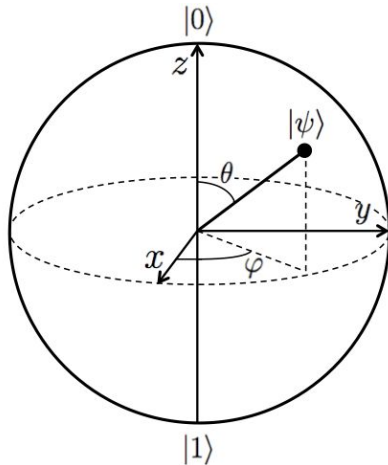
Miriam Lucio Martínez



What? Quantum Computing



- Instead of **bits** → **qubits**
- **Quantum logic gates** operate on these qubits



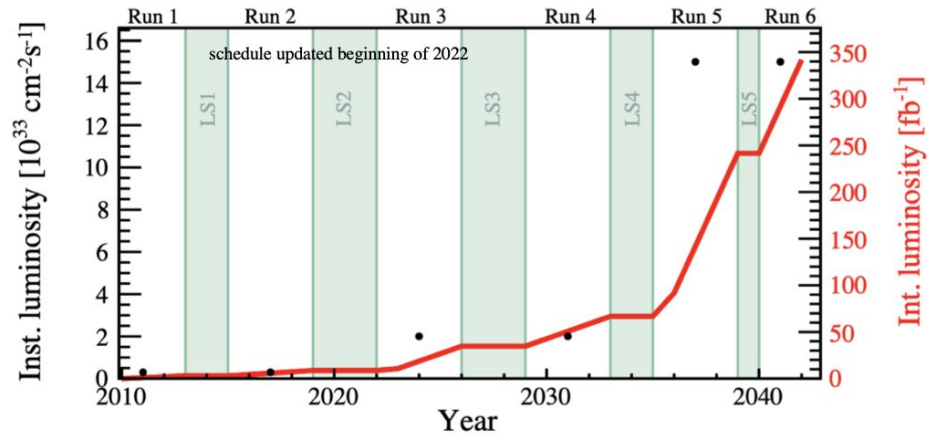
<https://quantumalgorithmzoo.org/>

QC + Machine Learning = **Quantum Machine Learning**

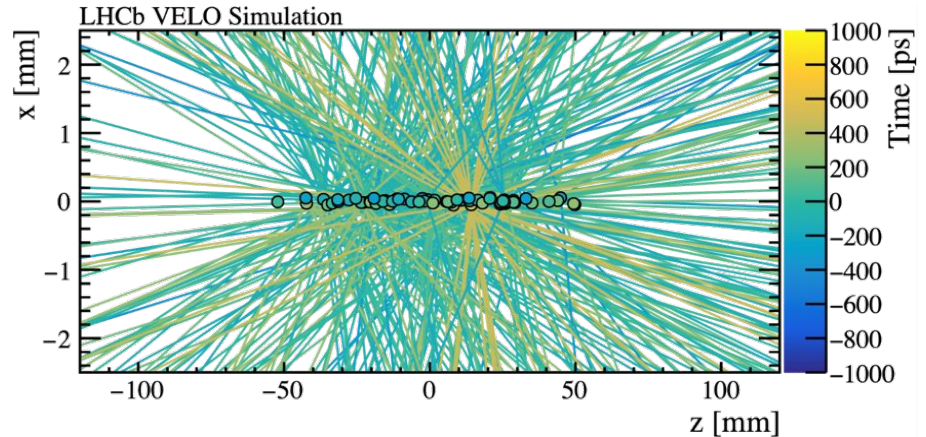
		Type of Algorithm	
		<i>classical</i>	<i>quantum</i>
Type of Data	<i>classical</i>	CC	CQ
	<i>quantum</i>	QC	QQ

Why QC?

- New algorithms and architectures needed to deal with the increased luminosity & limited bandwidth @ **HL-LHC**



[ECFA](#)



Courtesy of Robbert Geertsema

How?

LHCb simulated event $B_s \rightarrow \phi\phi$

1 collision event

Half of the Vertex Locator

