



ALICE & BOB

RESEARCH STARTUP AFTER ICFP MASTER

Jérémie Guillaud, Chief of Theory
François-Marie Le Régent, Doctorant CIFRE
18/11/2021



Inria

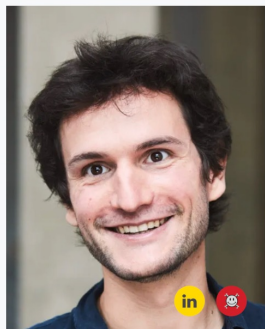


PSL 

ENS
ENS DE LYON



ALICE&BOB – ICFP: A LONG LOVE STORY



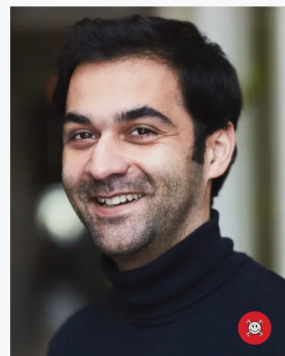
Raphaël Lescanne
CTO

2015/16



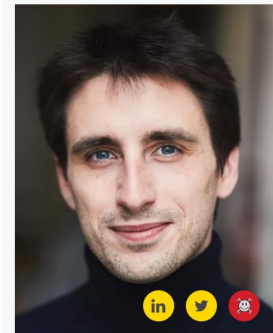
Nathanaël Cottet
Quantum Physicist

2013/14



Anil Murani
Quantum Physicist

2012/13



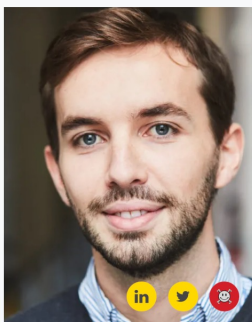
Théau Peronnin
CEO

2015/16



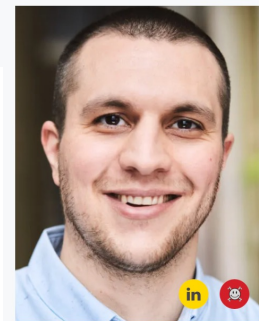
Pierre Février
Quantum Physicist

2012/13



François-Marie Le Régent
PhD

2019/20



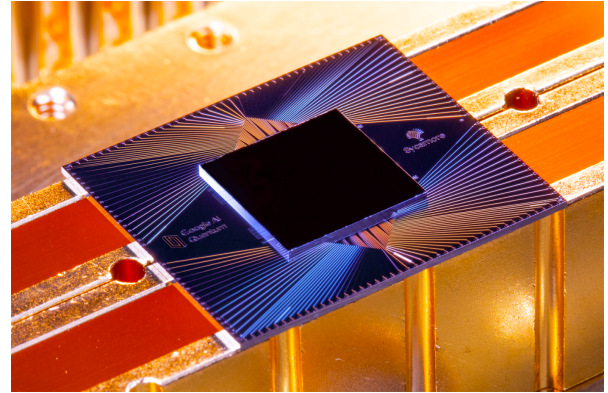
Sébastien Jezouin
Chief of Experiments

2010/11

ALICE & BOB GOAL: LARGE SCALE QC



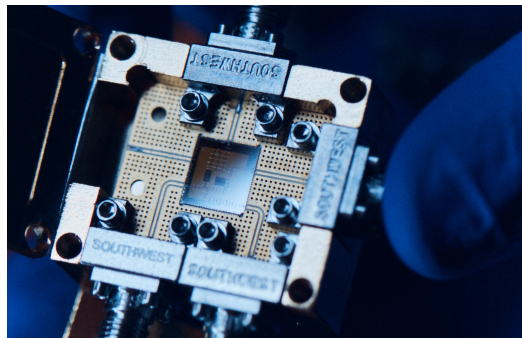
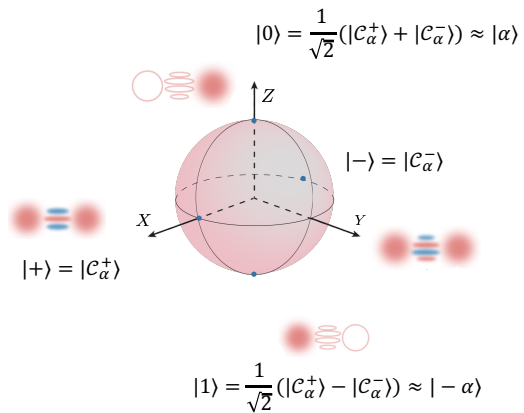
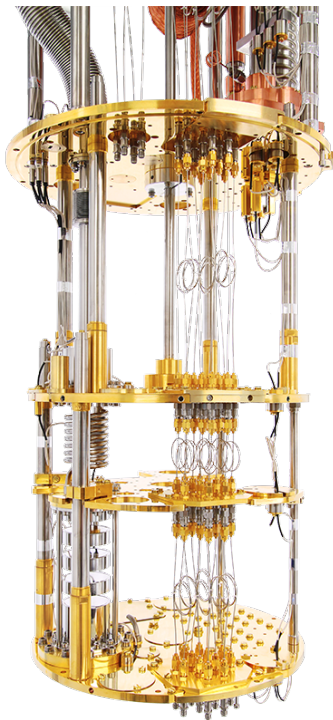
Classical RAM (Random Access Memory)
 $\sim 10^{-25}$ errors per bit per operation



Quantum processor
 $\sim 10^{-3} - 10^{-4}$ errors per bit per operation

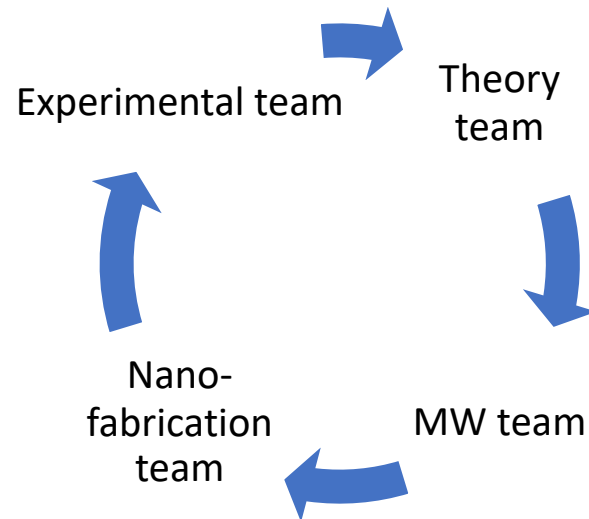
Large scale quantum computation
requires $\sim 10^{-10} - 10^{-15}$

ALICE&BOB TECHNOLOGY: THE CAT QUBIT



$$Z(\alpha|0\rangle + \beta|1\rangle) = \alpha|0\rangle - \beta|1\rangle$$

$$X(\alpha|0\rangle + \beta|1\rangle) = \alpha|1\rangle + \beta|0\rangle$$

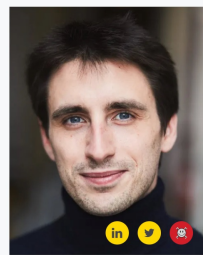


ALICE & BOB IN A NUTSHELL

- Founded in March 2020



Raphaël Lescanne
CTO



Théau Peronnin
CEO

Inria



PSL



ENS
ÉCOLE NORMALE
SUPÉRIEURE



- Seed round of funding €3M in March 2020



elaia



breega

- As of today: Office & lab installation in 450m2 office in Balard – team of 30+ people

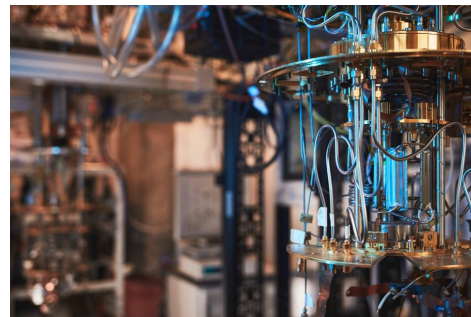
HELLO 🙌

- M1 internship @Atos
 - March 19 – August 19
 - Quantum computing
- ICFP M2 2019-2020
 - September 19 – April 20
 - Quantum physics track
- M2 internship @INRIA
 - April 20 – July 20
 - Mazyar Mirrahimi
- PhD between A&B and INRIA

Atos



Inria



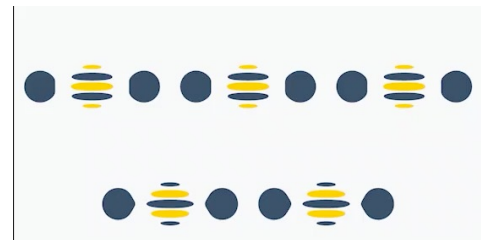
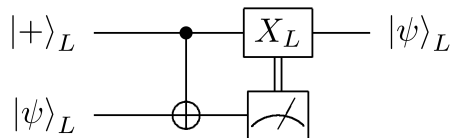
TYPICAL WEEK

- Universal Fault-tolerant quantum computer using cat qubits

- Theoretical research

- Shared time

- Alice&Bob
 - @Balard, 15th arrondissement
 - ~30 people
- INRIA
 - @Gare de Lyon
 - 5 PI and ~10 PhD students



PHD WITH OR WITHOUT A COMPANY ?

- 100% Academic PhD



PHD WITH OR WITHOUT A COMPANY ?

- 100% Academic PhD
- CIFRE
 - x% academic & (1-x)% company
 - 3 actors
 - Company → Research axes & funding
 - Academic laboratory → scientific supervision
 - You!



<https://www.enseignementsup-recherche.gouv.fr/cid22130/les-cifre.html>
<http://www.anrt.asso.fr/fr/cifre-7843>

HOW TO CHOOSE?

- **Talk** to people → increase the opportunities
- Compare the possible choices:

- PhD director
- Subject
- Team spirit
- Funding
- Cooperation



Rockstar 🤘 vs Pedagogical 🧑🏫
Trendy 📈 vs Original 💎
Competitive 🔥 vs Supportive 🥰
~1700€ 💶 vs ~2100€ 💵
Foreign universities 🌍

→ Personal choice

PERSONAL EXPERIENCE

- Talk to a lot of “quantum interested” companies...

AIRBUS
GROUP

IBM



Atos

Google



- ... And startups



PASQAL

ALICE & BOB



ALICE & BOB, RESEARCH STARTUP

- Strong scientific board



B. Huard



Z. Leghtas



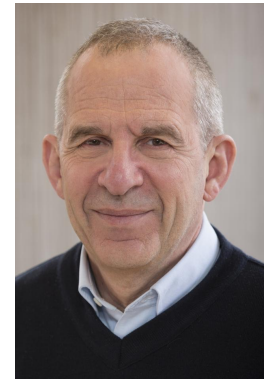
P. Campagne-Ibarcq



M. Mirrahimi



E. Flurin



M. Devoret

ALICE & BOB, RESEARCH STARTUP

- Strong scientific board
- Team of driven people

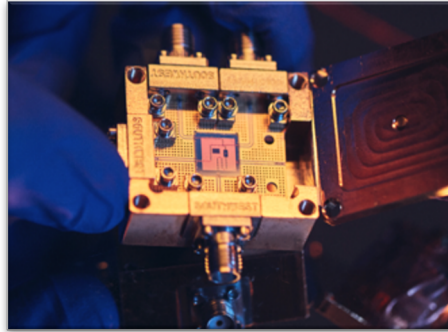


CHOOSE YOUR PHD TRACK

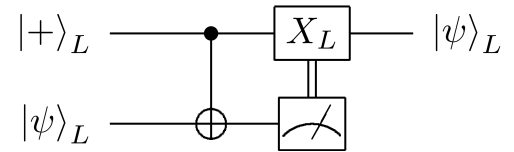
- Strong scientific board
- Team of driven people
- Direct synergy between theory and experiments



Fab & design 🧐



Cats 🐱 & qubits



Architecture 🧑‍💻

ALICE & BOB, RESEARCH STARTUP

- We are hiring!
 - Curious, honest and ambitious people
 - M2 Internships
 - PhD positions
- Stimulating research in a highly collaborative environment






ALICE & BOB

Come and talk!

THANKS

 contact@alice-bob.com

 Alice & Bob

 @Alice__Bob

Jérémie Guillaud

jeremie.guillaud@alice-bob.com

François-Marie Le Régent

francois-marie.le-regent@alice-bob.com