

Mid-Term Check

10 December 2018, Brussels

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ESR3, WP4

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EASITrain – European Advanced Superconductivity Innovation and Training. This Marie Skłodowska-Curie Action (MSCA) Innovative Training Networks (ITN) has received funding from the European Union's H2020 Framework Programme under Grant Agreement no. 764879

ESR3, WP4 - Background

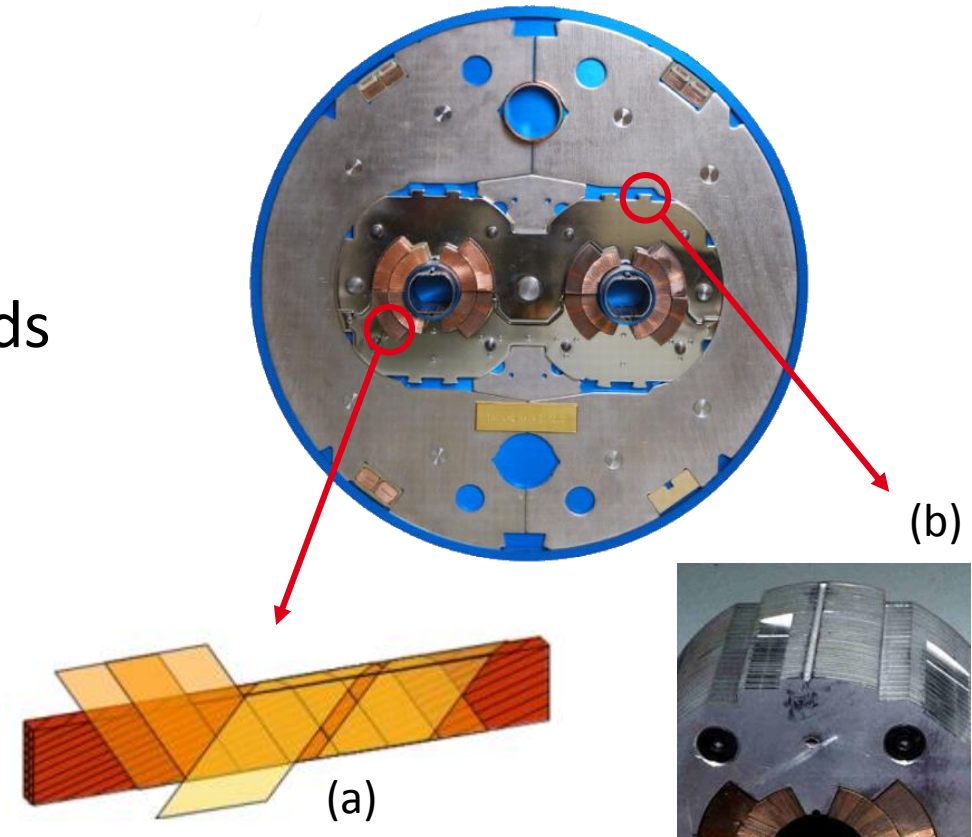
- Background: MSc in **Energy and Nuclear Engineering**, Politecnico di Torino, Italy
- Contract start date: **12/03/2018**
- Host institute: **CEA Paris Saclay**
- EASITrain Supervisor(s): **Bertrand Baudouy**
- PhD Title: Study of mass and heat transfer in **superfluid helium** in confined media
- PhD University: **Université Paris Saclay**
- Planned secondments:
 1. **CERN** (Genève), numerical work on helium phase transition, 2nd year, 1 month.
 2. **SigmaPhi** (Vannes), superconducting magnet design, 3rd year, 2 weeks.

Role in the Project & Objectives

- **Role:** Model and experimentally validate the **heat transfer** in helium under different thermodynamic conditions in channels with hydraulic diameters from a few mm down to **micrometers** in steady state and transient conditions
- **Main objectives:** Understanding the thermal phenomena in superfluid helium in micro-channels, achieving **improved cryogenic design** of magnet coils

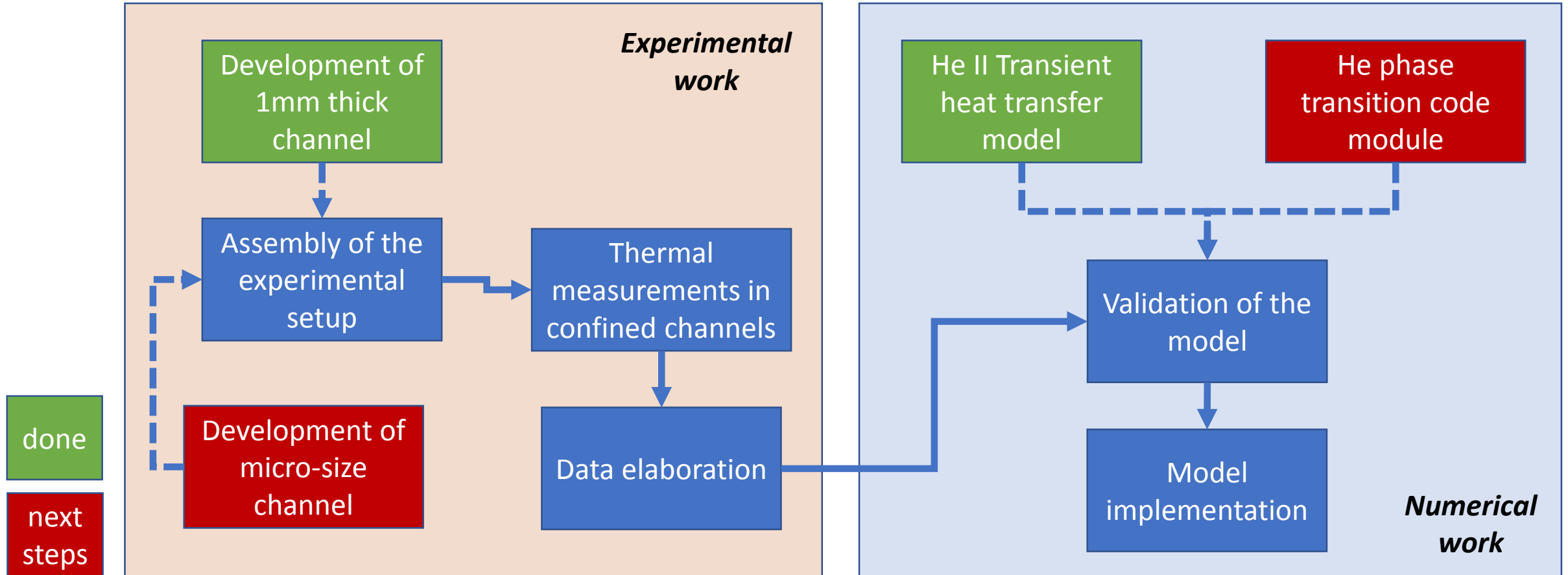
Research, Methodology, Results & Next Steps

- Magnet cooling is ensured by **He II** to maintain the superconductive state against generated or deposited heat loads
- Confined geometries constitute the highest thermal barrier for cooling:
 - a) Cable electrical **insulation**
 - b) Space between steel **collars**



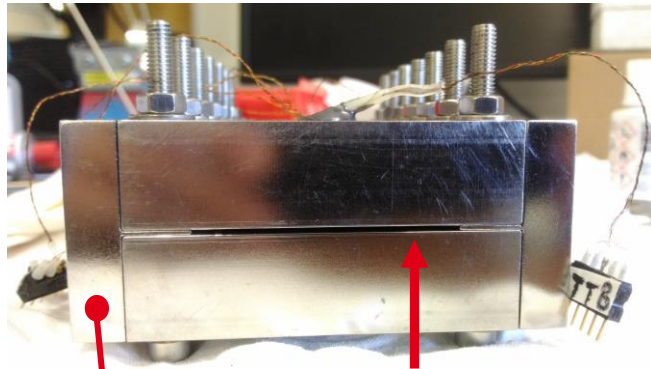
DOI: 10.1098/rsta.2011.0453

Research, Methodology, Results & Next Steps



Research, Methodology, Results & Next Steps

Experimental sample



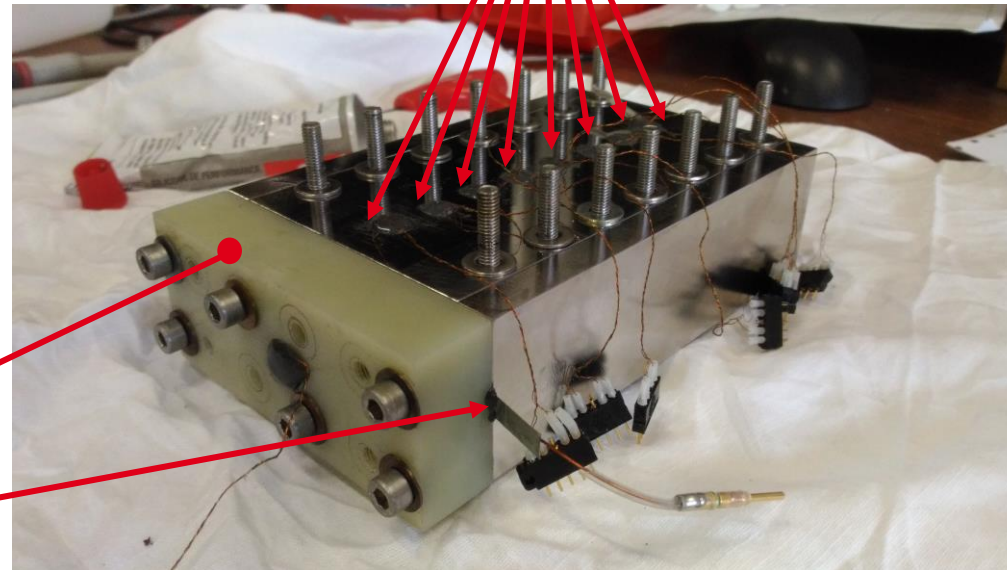
1mm thick
channel

Wedge

Heater support

Heater

Temperature sensors 1-8

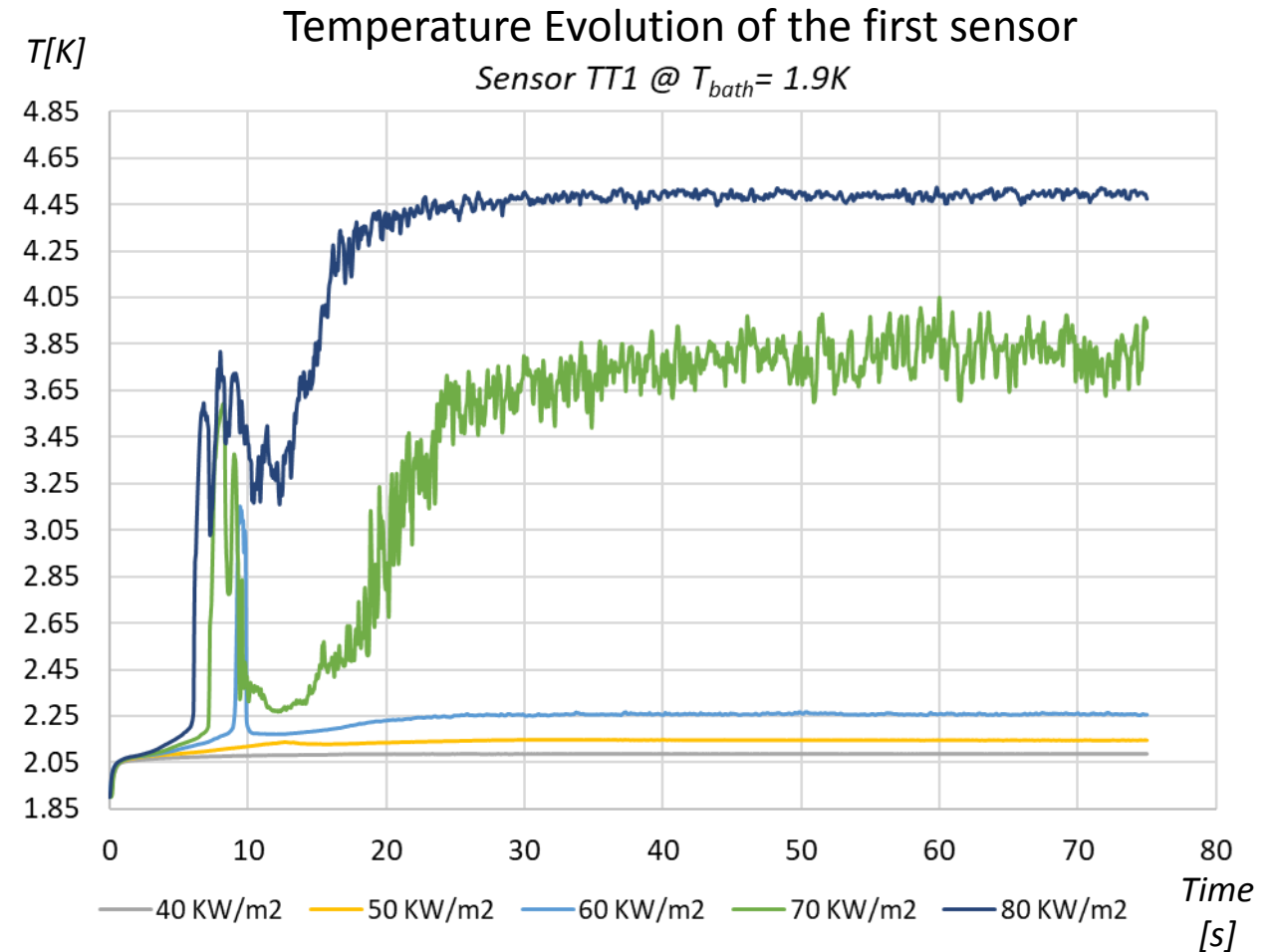
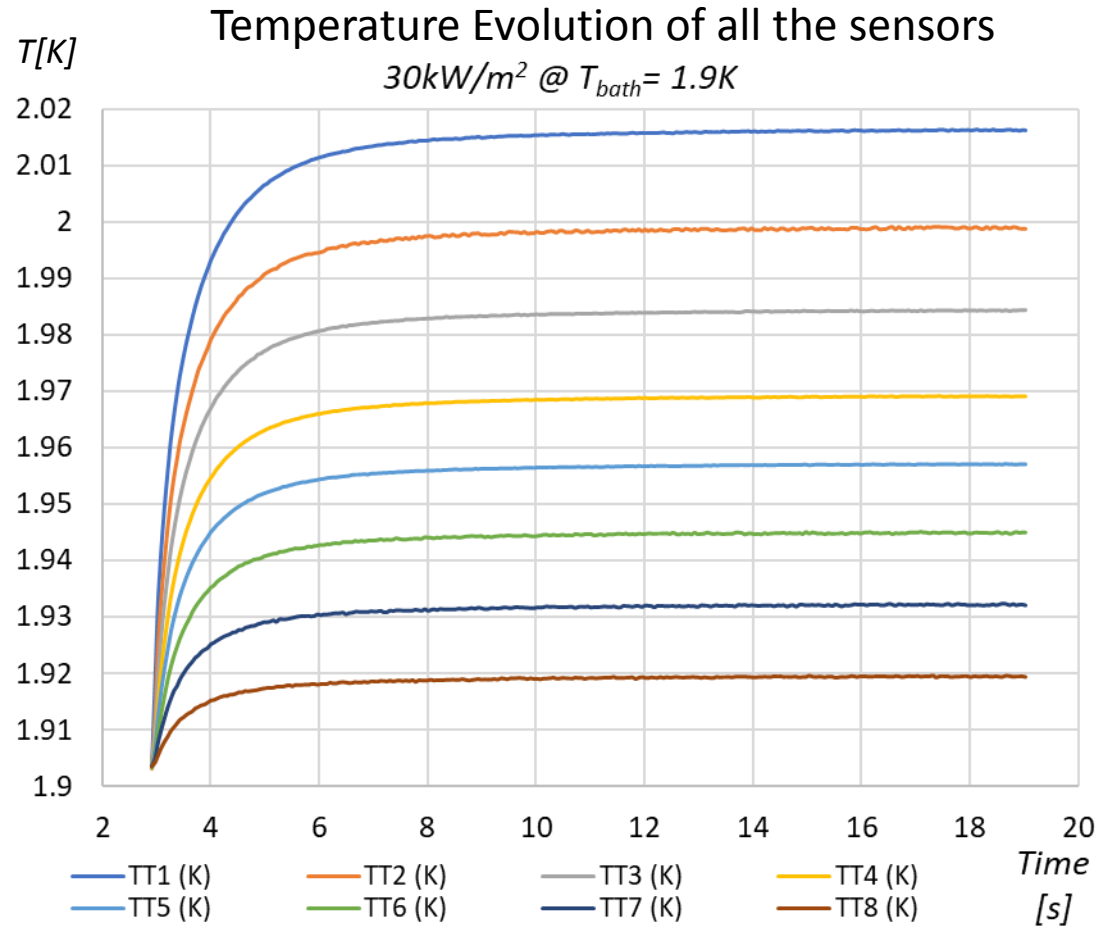


Experimental sample

Cryostat



Research, Methodology, Results & Next Steps



Training, Conferences & Workshops

- Conferences:

- ✓ FCC Conference, 9th-13th April 2018 in Amsterdam, the Netherlands



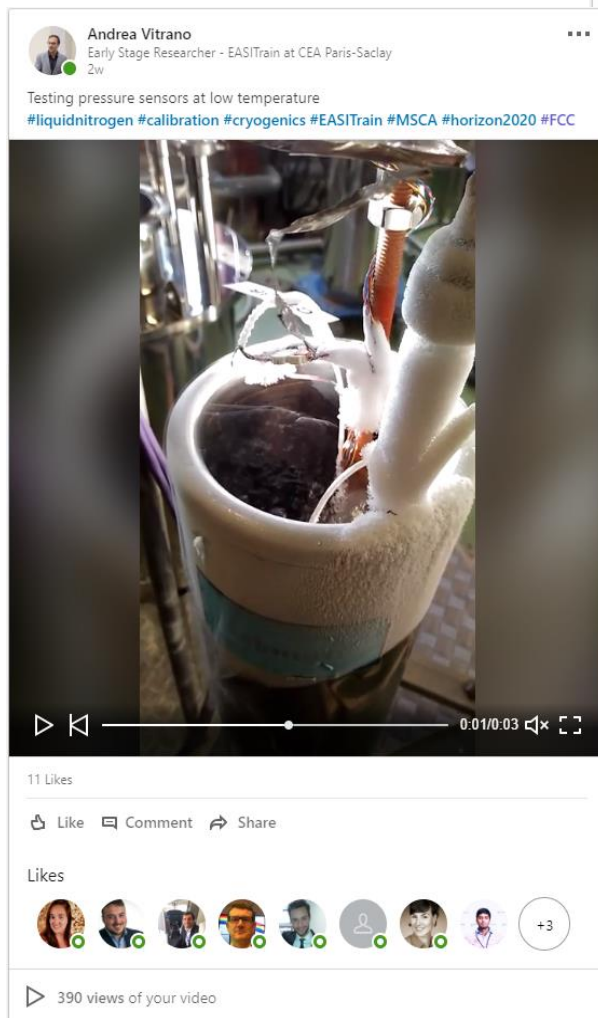
EASITrain lectures at CERN, 5th-23rd March 2018

EASITrain Media Training Workshop, Terra Mater Factual Studios (Vienna), 12th September 2018



Project Management Vernissage, Vienna University of Economics and Business, 10th-11th September 2018





EASISchool in Vienna, 3rd-14th
September 2018

LinkedIn
posts about
my research

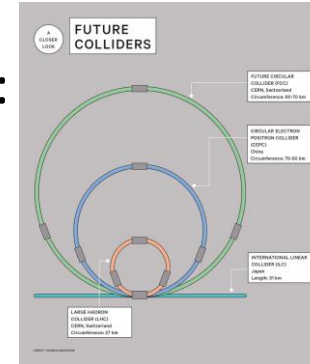
FCC week
2018
Amsterdam,
9th-13th April
2018



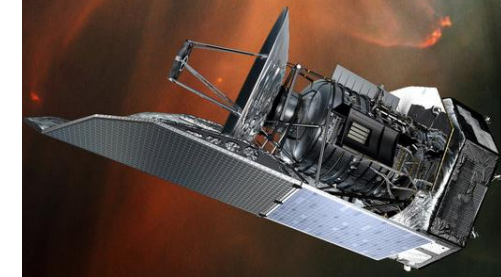
Pic by Panagiotis Charitos

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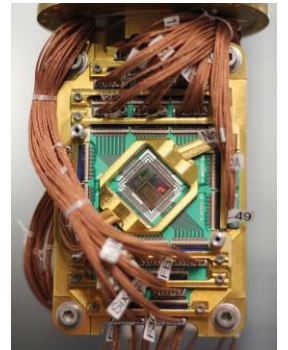
- Impact of my research on **science** and **society**:
 - **Future colliders** for fundamental research
 - Observational devices in **artificial satellites**
 - **Quantum computer** chips
- Impact of being a **MSC fellowship** on me and my career:
 - **Personal skills**: French language, discovering new culture habits
 - **Career path**: acquisition of expertise, collaboration with experienced researchers, connection with institutions and research centers
 - **Personal experience**: enjoying the international scientific environment



Cosmos magazine



ESA/ AOES Medialab; (NASA/ESA/STScI)



thinkingmachineblog.net

Thank you for your attention

Questions?



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