DE LA RECHERCHE À L'INDUSTRIE

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Advanced modelling of cooling architectures for large scale infrastructures

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EASITrain

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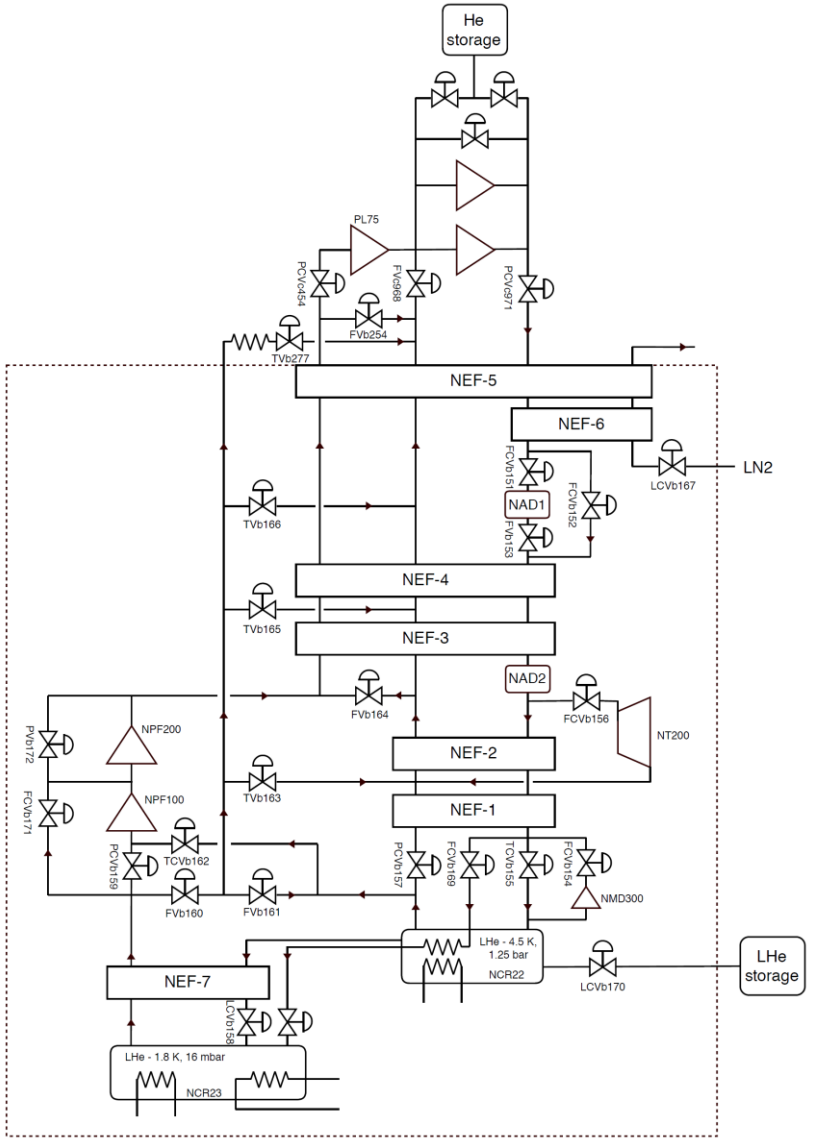
EASITrain – European Advanced Superconductivity Innovation and Training. This Marie Sklodowska-Curie Action (MSCA) Innovative Training Networks (ITN) has received funding from the European Union's H2020 Framework Programme under Grant Agreement no. 764879

Work objectives

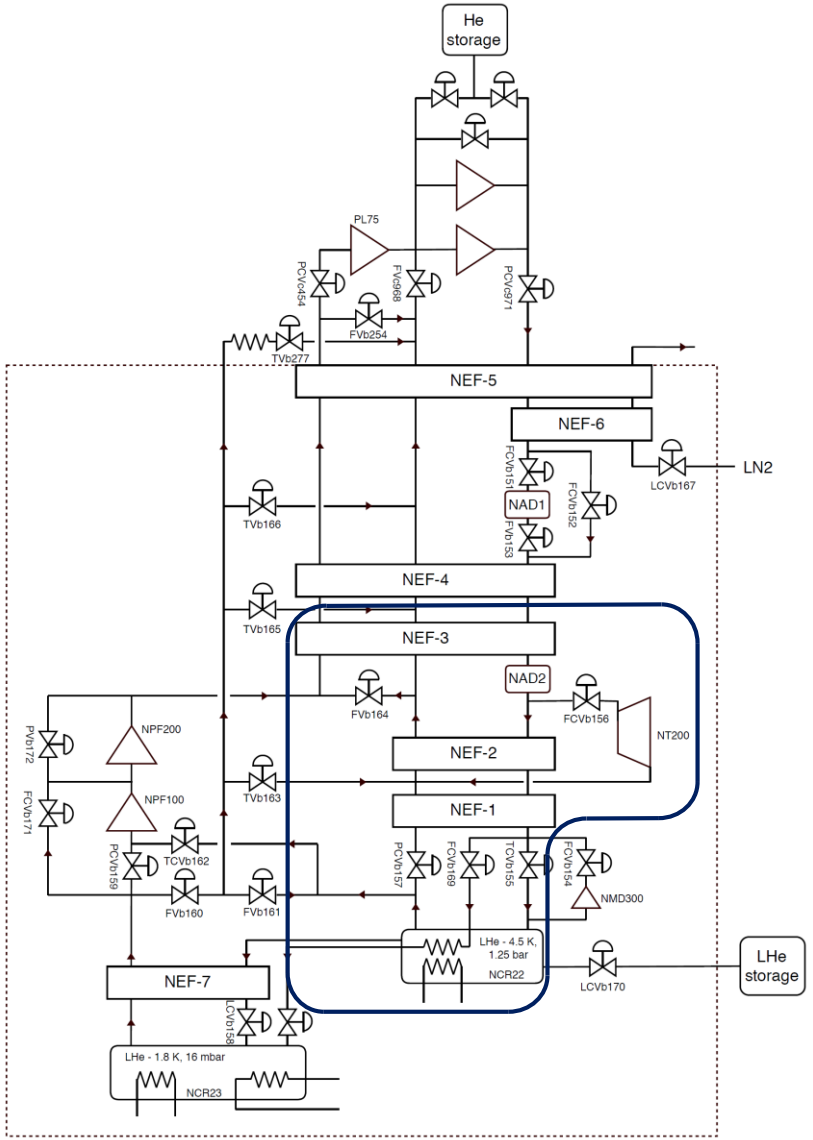
- Study the process cycles of large cryogenic systems
- Develop the CEA modeling software SimCryogenics
- Validate the dynamic models with existing cryogenic plants
- Personal objectives (PhD, scientific development)

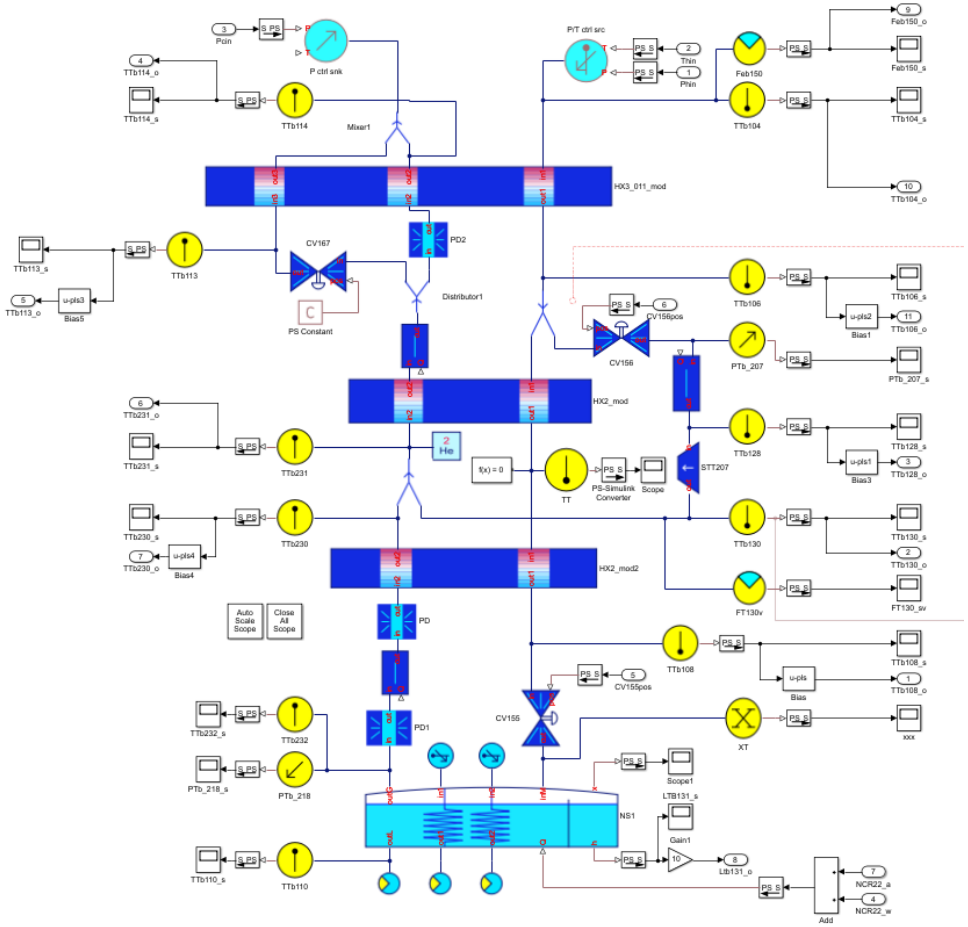
400 W @ 1.8 K CEA SBT plant

1.8 K cryoplant at CEA Grenoble

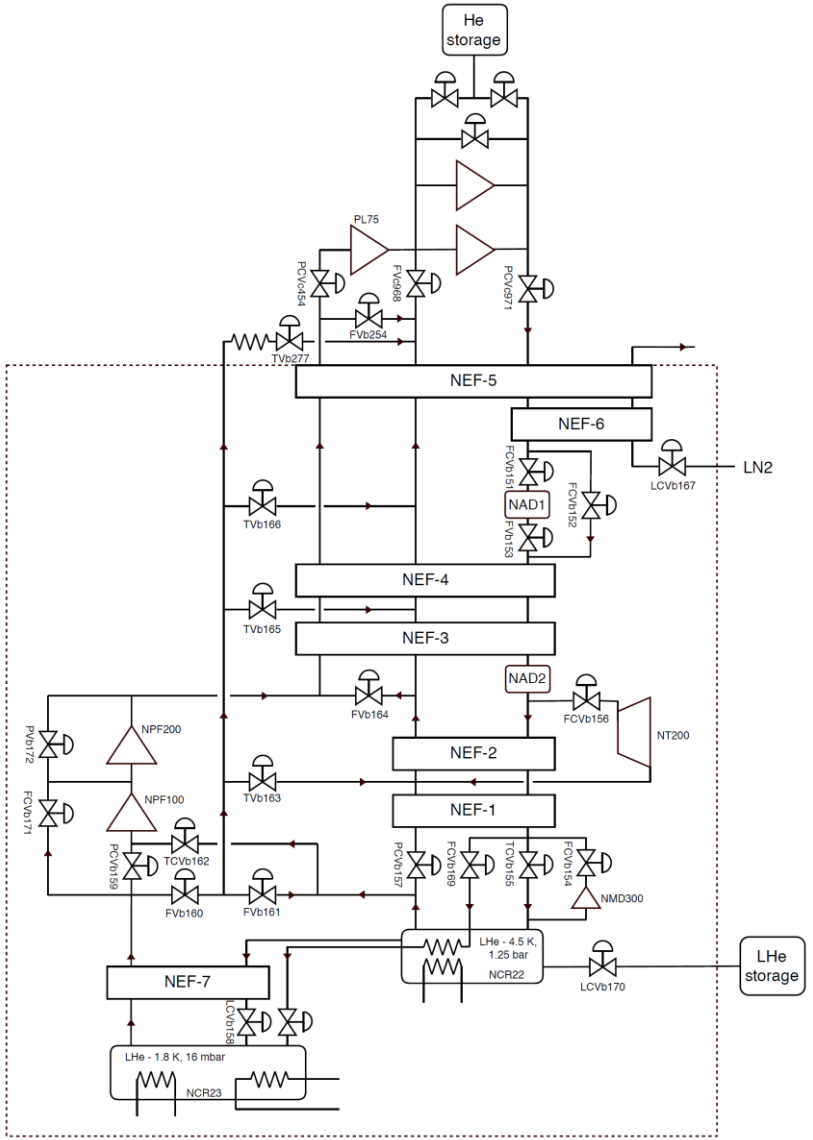


1.8 K cryoplant at CEA Grenoble

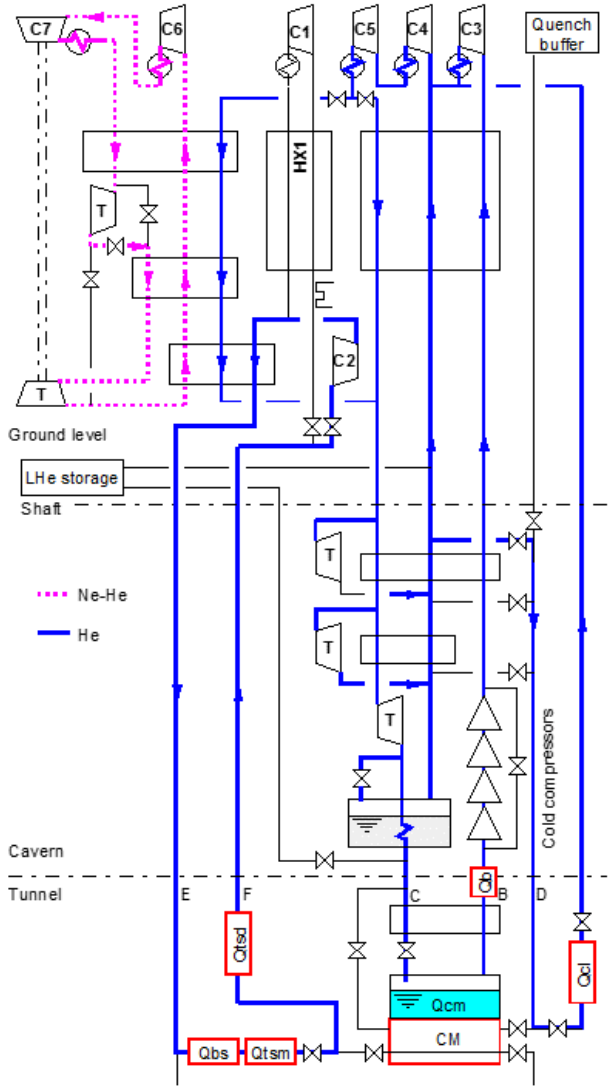




Further steps



400 W @ 1.8 K CEA SBT plant



L. Tavian – Conceptual design of the refrigeration process cycle

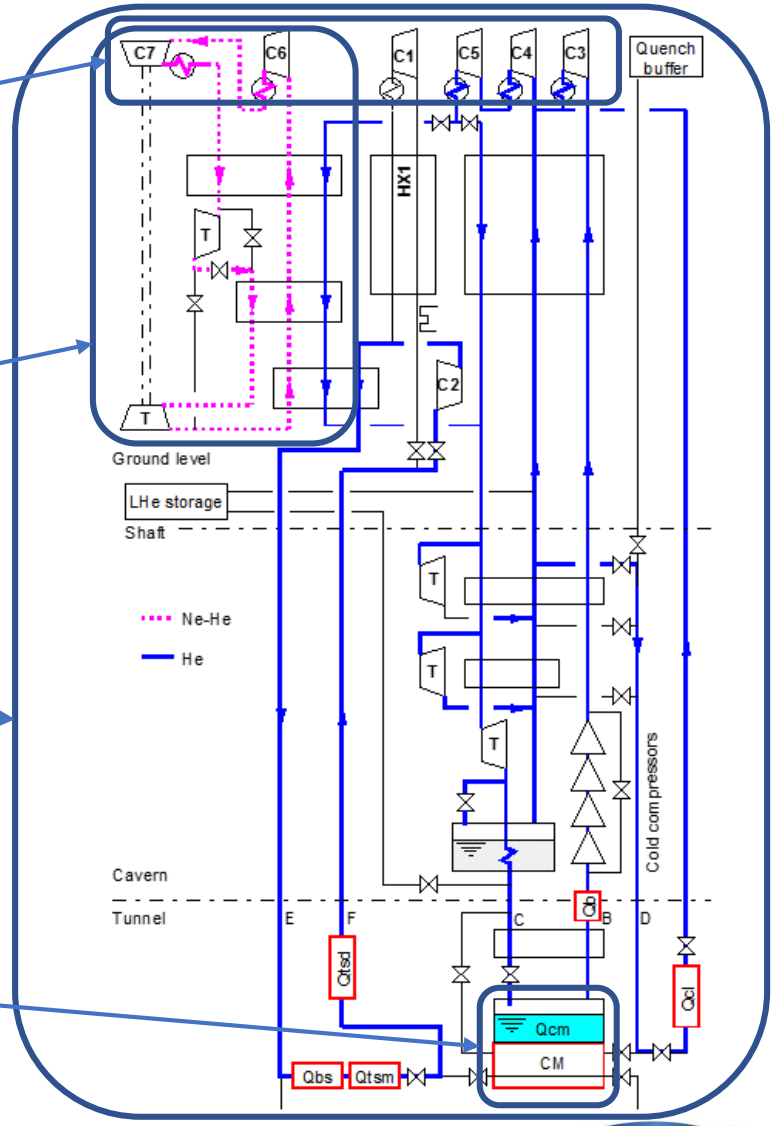
Further steps - collaboration

ESR15
USTUTT

ESR11
TUD

ESR4
CEA Grenoble

ESR3
CEA Saclay



L. Tavian – Conceptual design of the refrigeration process cycle

Further steps – collaboration and valorization

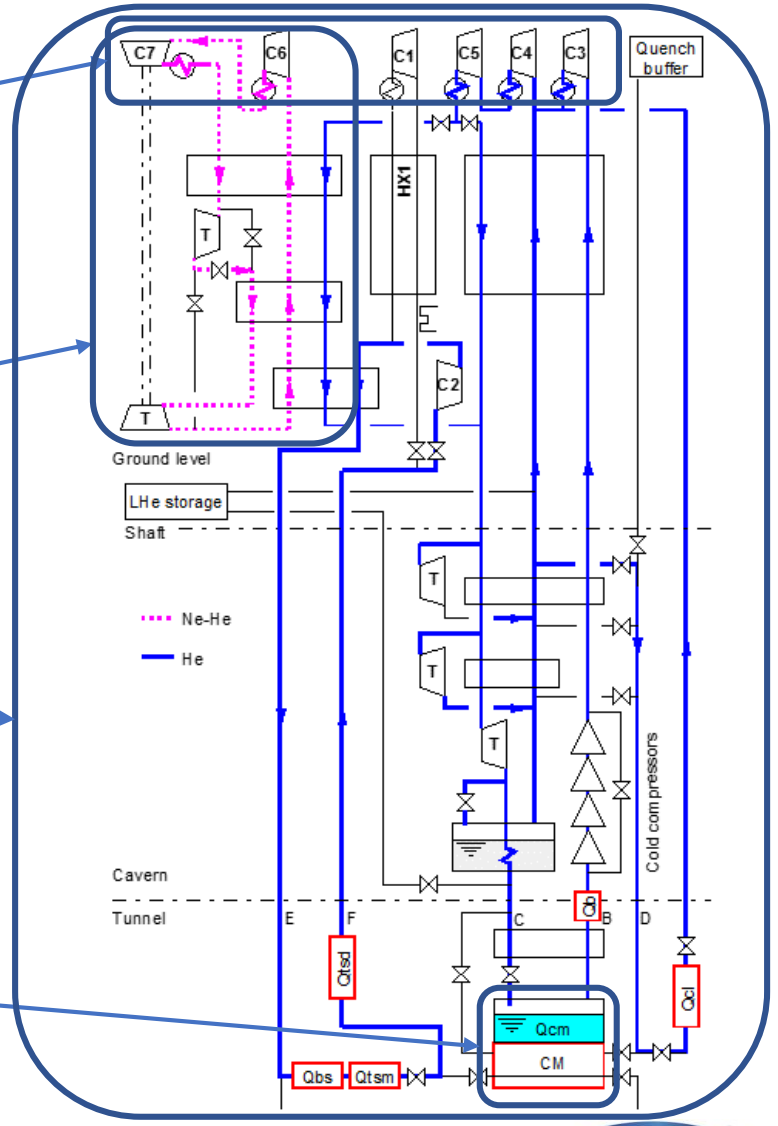
ESR5
WUW

ESR15
USTUTT

ESR11
TUD

ESR4
CEA Grenoble

ESR3
CEA Saclay



L. Tavian – Conceptual design of the refrigeration process cycle

Working plan

Starting date: 1 March 2018

Years 2018/2019

- Model the centrifugal compressor as a part of large cryogenic system
- Develop a tool to model the mixed refrigerants cycle

Years 2019/2020

- Validate the dynamic model with existing facilities (single fluid and mixed refrigerants)

Years 2020/2021

- Valorization and thesis

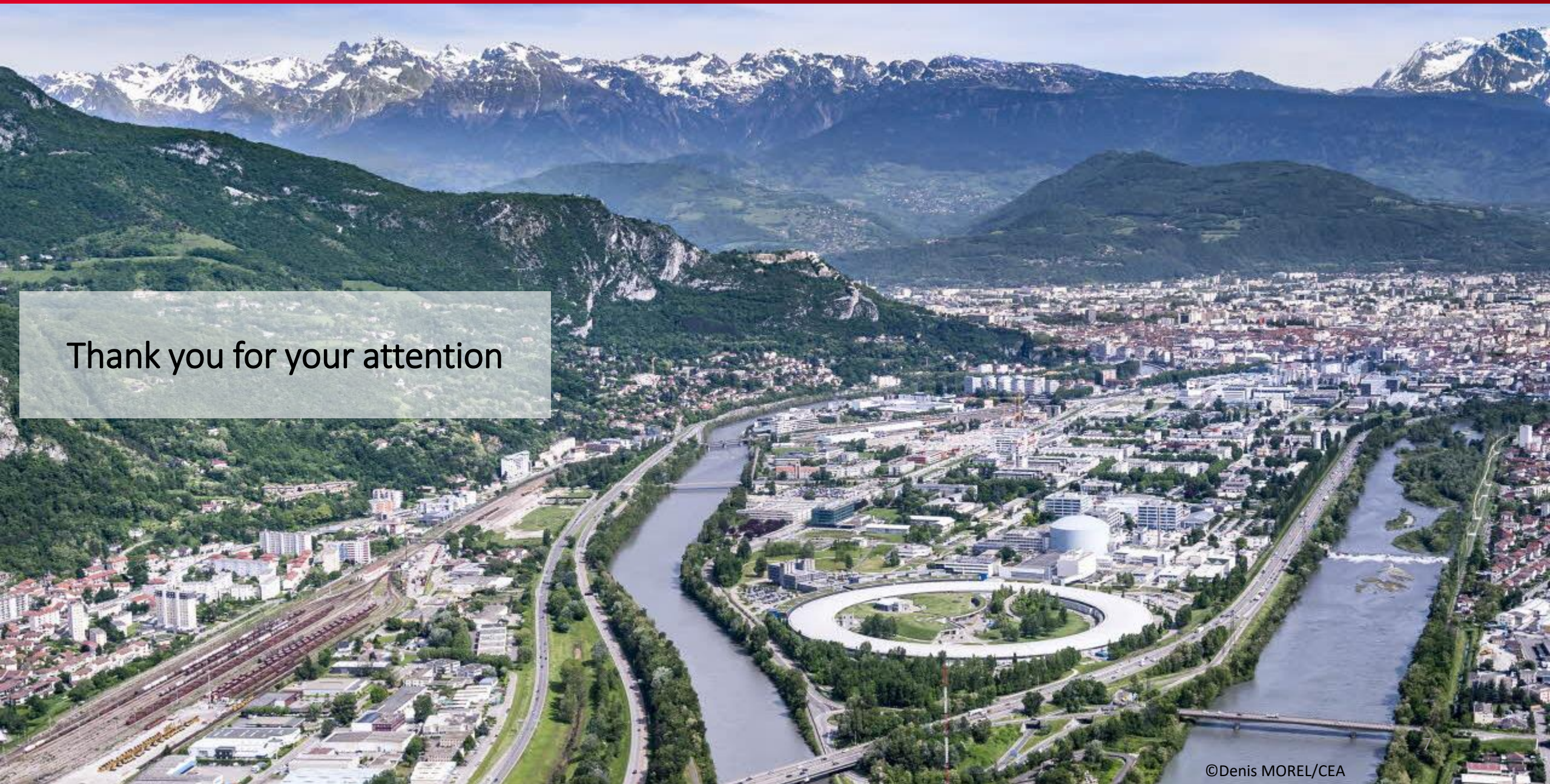
Challenges and risks

Challenges:

- Time constraints
- Scientific challenges
  - Cold compressor modelling
  - Mixed refrigerants database development
  - Model validation thanks to industry collaboration
- SimCryogenics model valorization

Risks:

- Time
- Unsuccessful theory implementation



Thank you for your attention

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