Einstein Telescope

/ NL / BE / DE /

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From Science to Business

Sorption-based Vibration-free cryocooling

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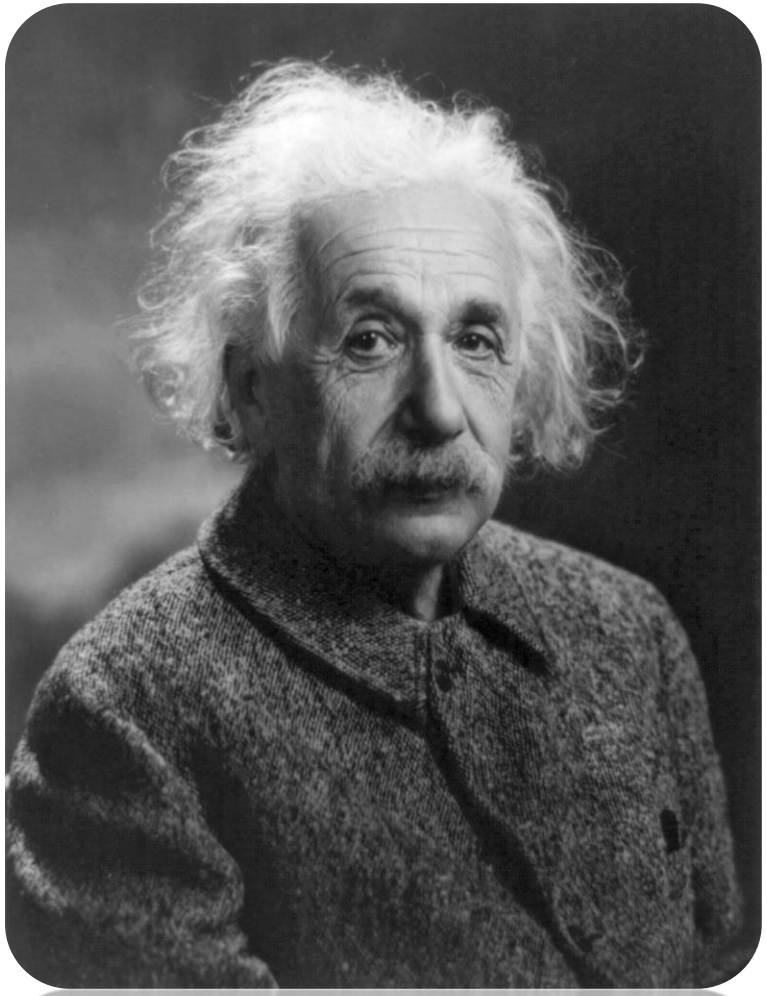
From Science…



Who's this?

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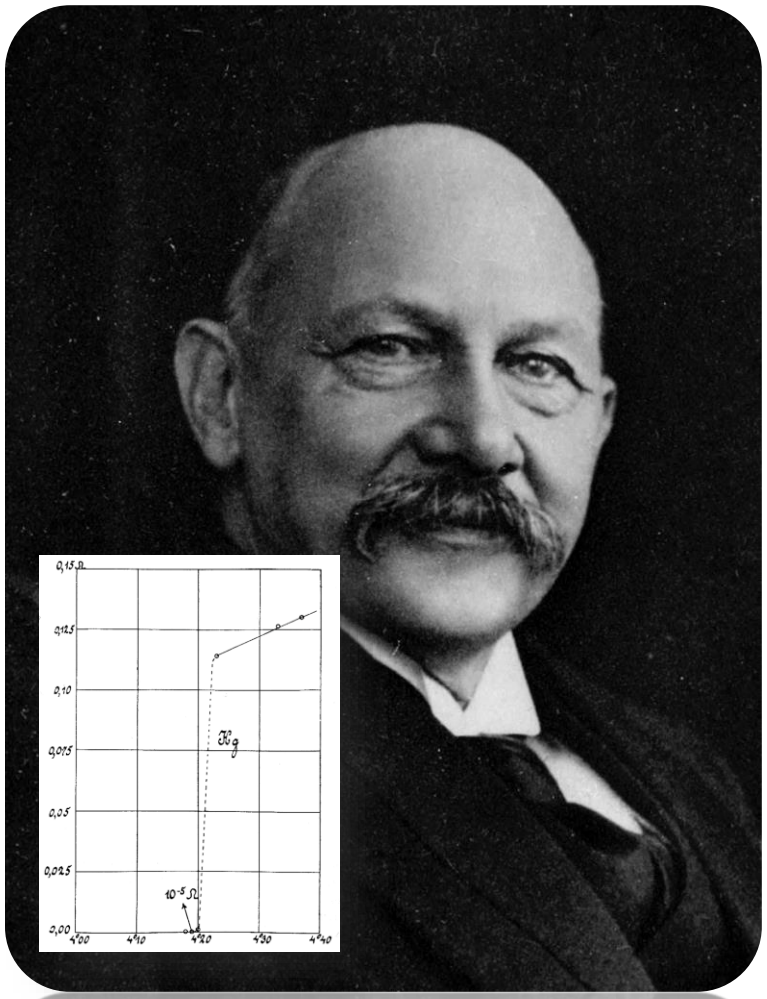
From Science…

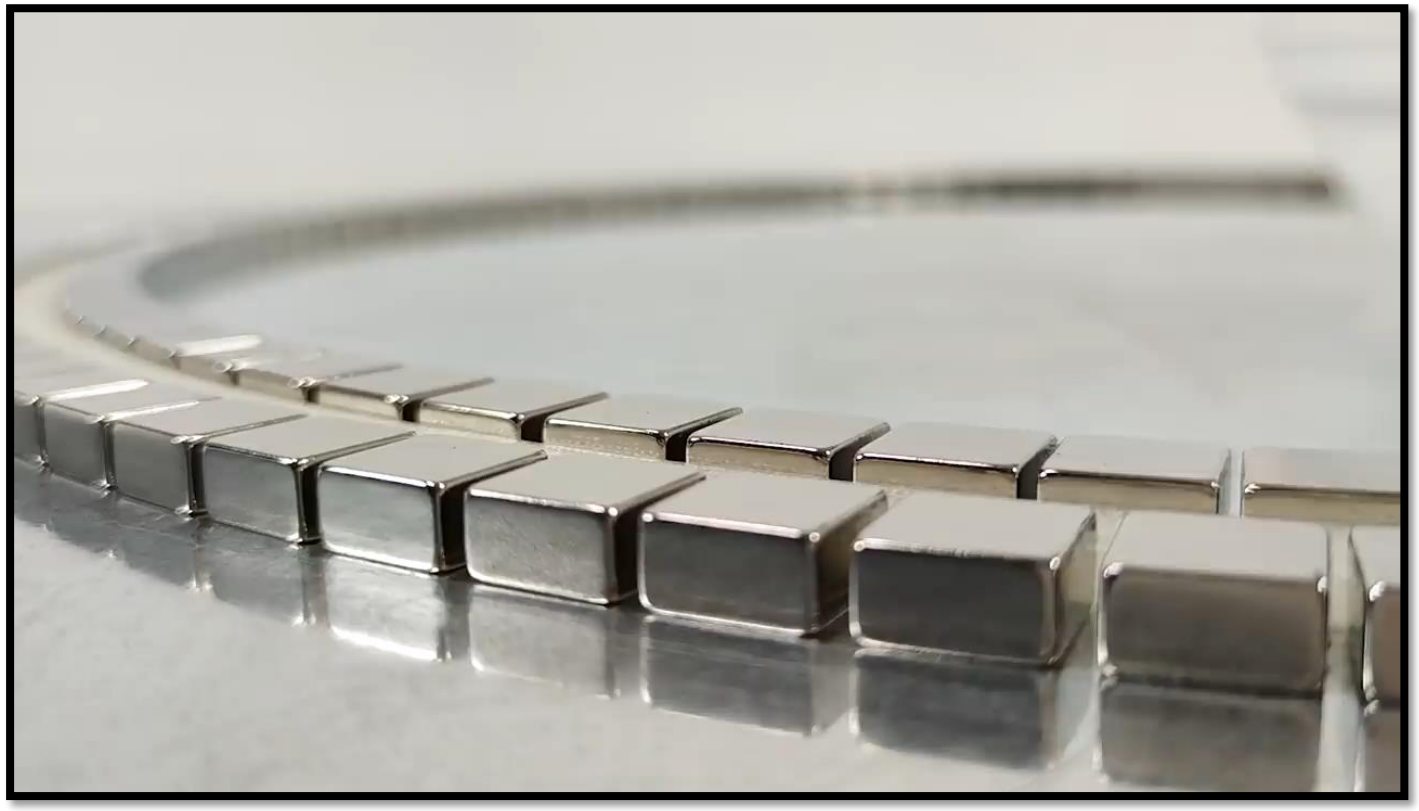
Who's this?

From Science…

Heike Kamerlingh Onnes, the Dutchman who, in 1908 liquified helium for the very first time in Leiden.

From Science…





And in 1911 discovered superconductivity.

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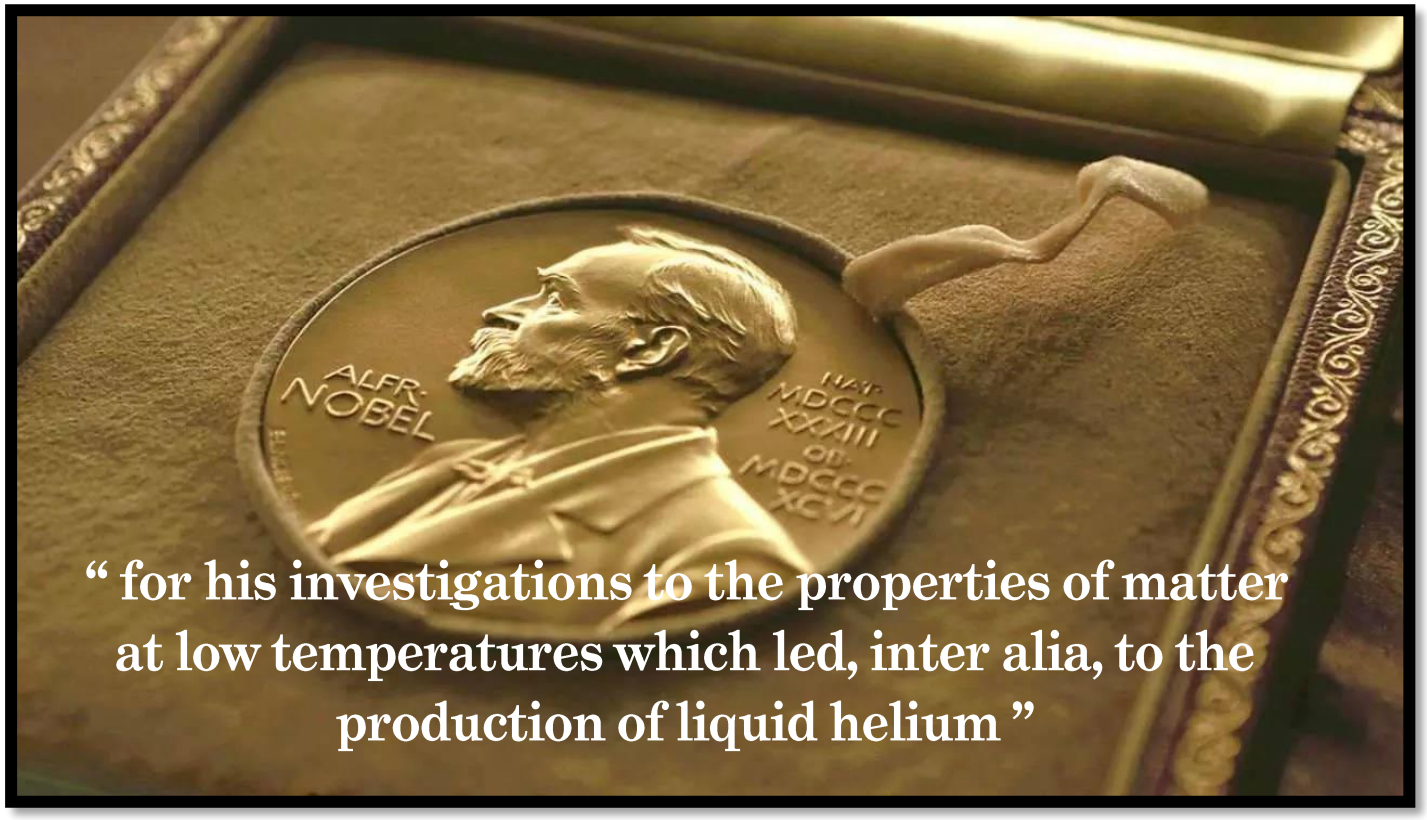
From Science…

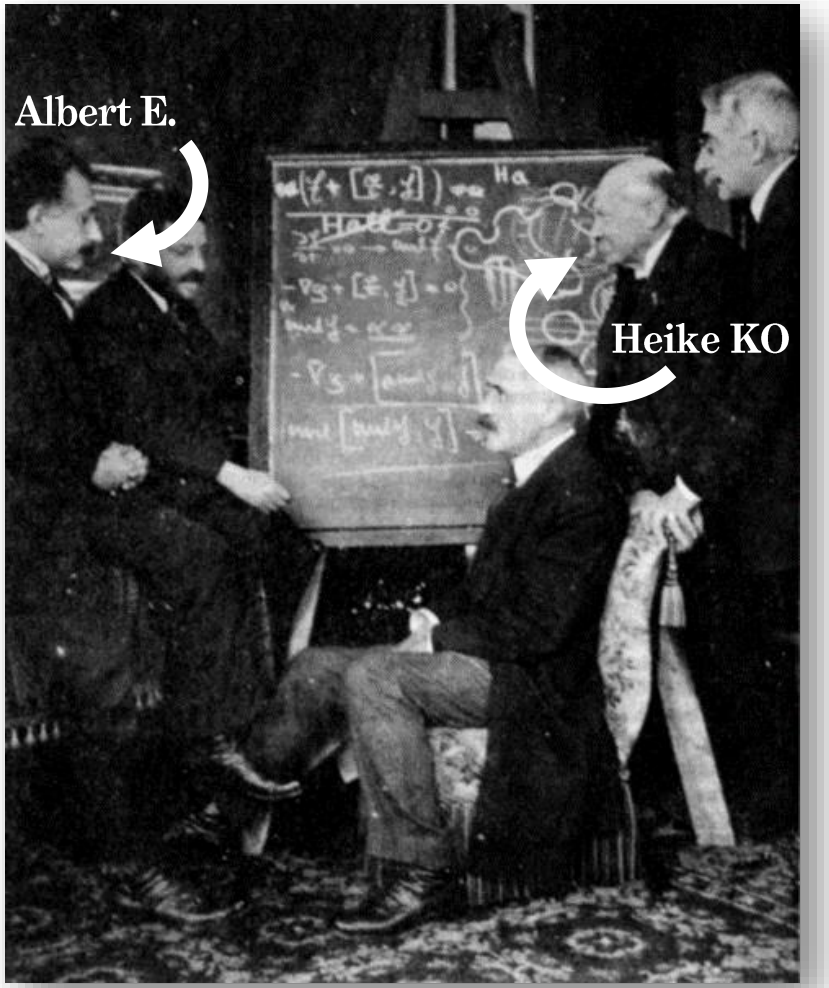


And got the Nobel price for it in 1913.

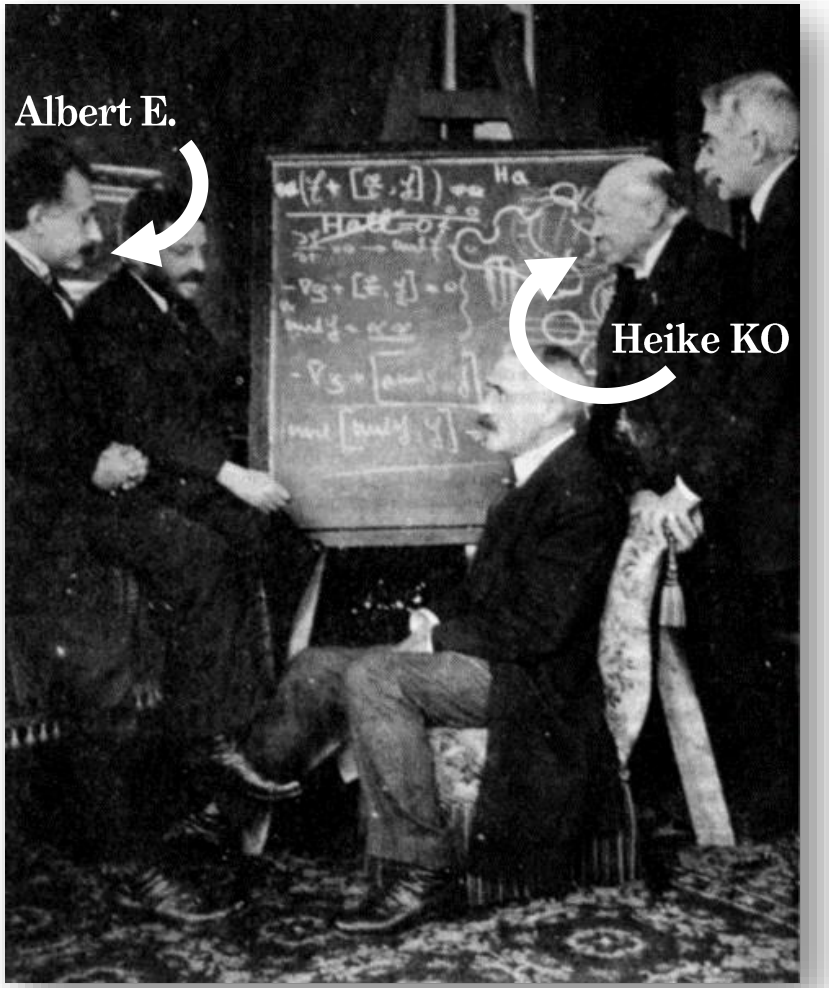
From Science…

And turned down Albert Einstein as an assistant in his lab.

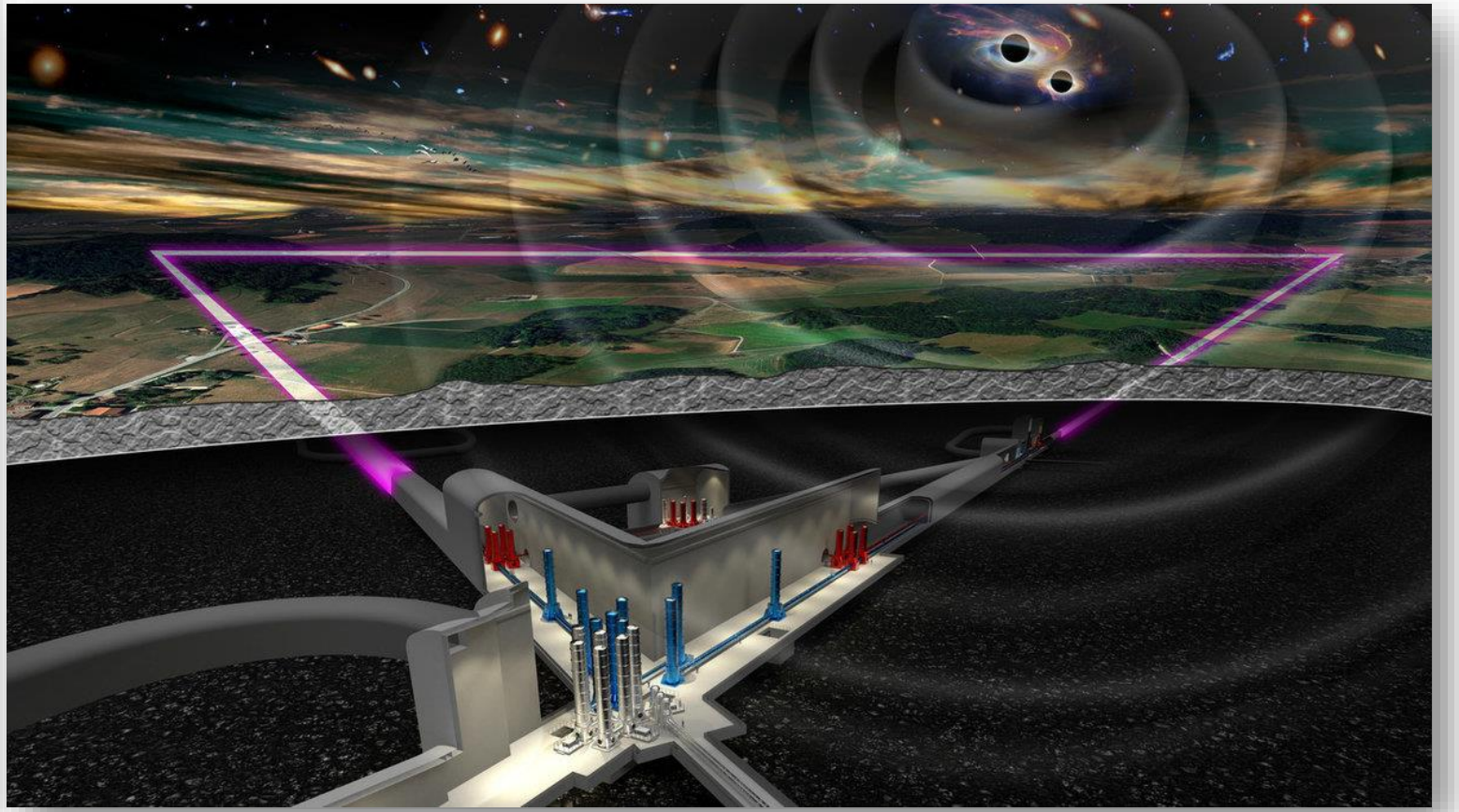
From Science…



From Science…



The Einstein
(and a little bit Kamerlingh-Onnes)
Telescope



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The unique Cryogenic Network of the Netherlands

The ETPF Cryo Consortium

DEMCON | KRYOZ

Established system- and knowledge provider including vibration free cryocooling products.

COOLL

Industrial producer of high-end activated carbon, currently used inside their domestic heat pump system.

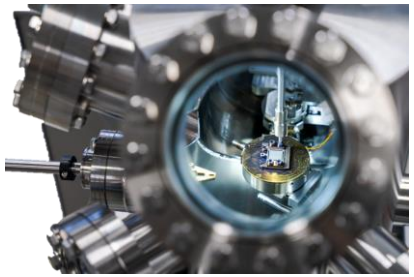
UNIVERSITY OF TWENTE.

Proven track record on vibration free sorption cryocooling research.

DEMCON

- Developer and producer of high-end high-tech systems and products

- Thin-film PLD systems



- Miniature CryoEM cryocooler

- Cooler for space satellites

- Eye surgery fluidic pump

- Soldier mobile power system

- Laser communication system

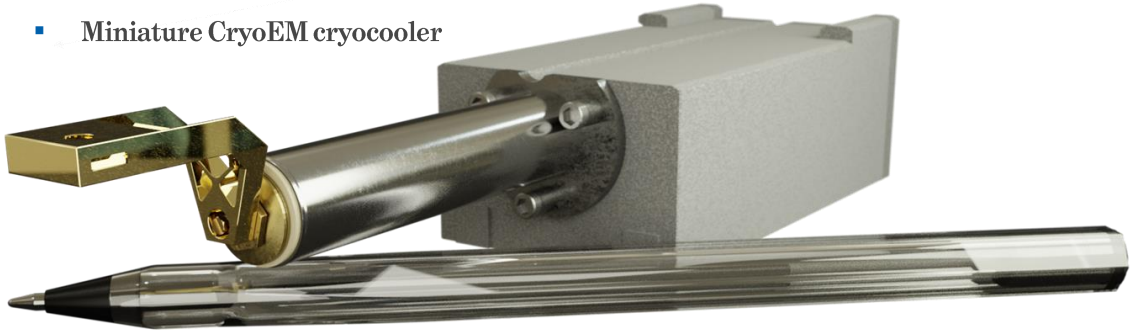
- Unmanned, autonomous offshore platform

- Surgical stitch instrument

DEMCON kryoz - Zero vibration cryocooling

- Developed as a next generation cryocooler for high-resolution microscopy

- Miniature CryoEM cryocooler



DEMCON kryoz - Zero vibration cryocooling

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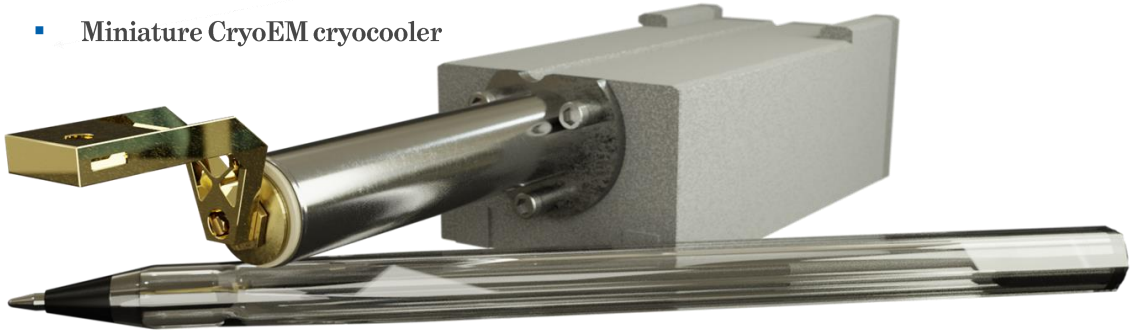

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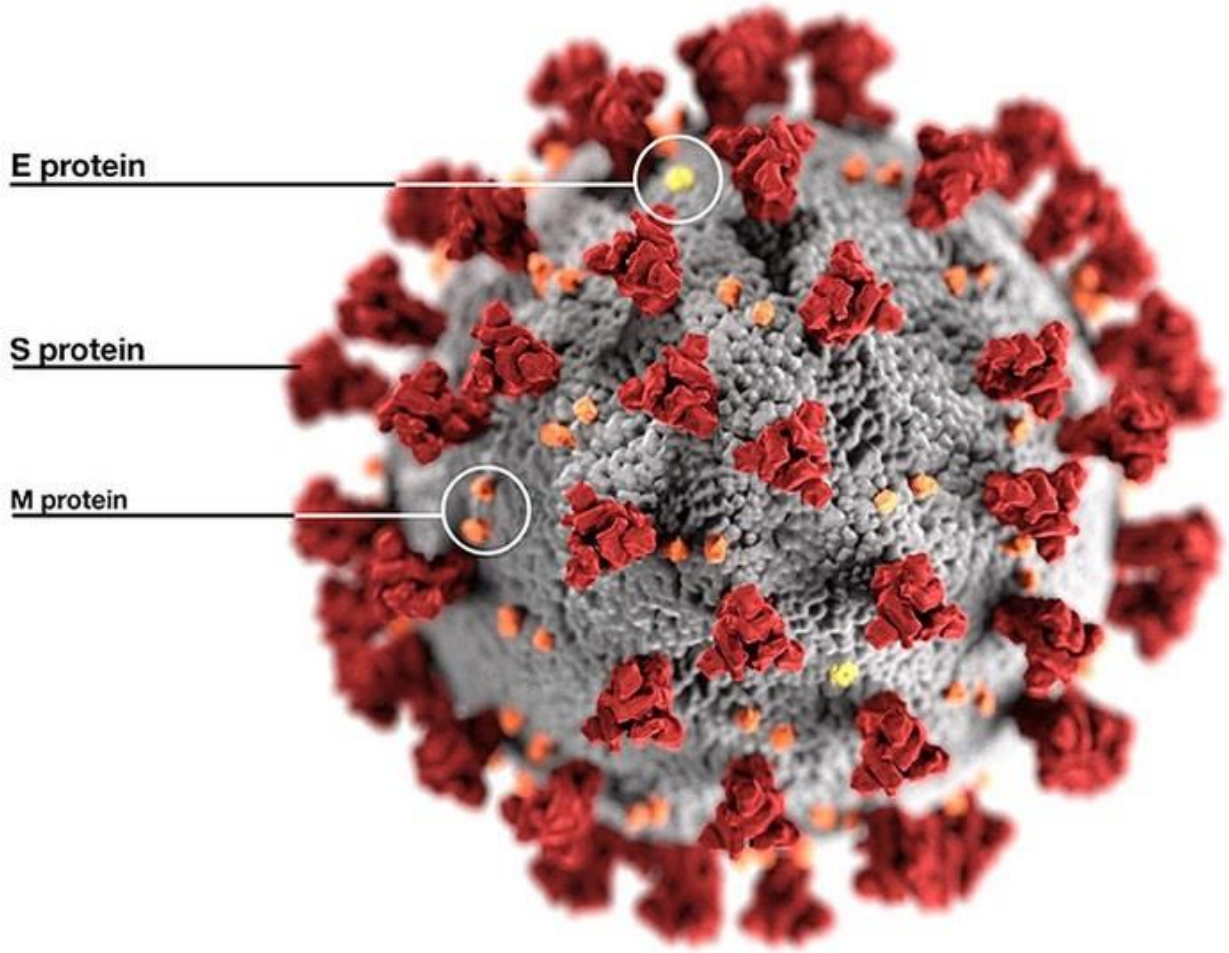
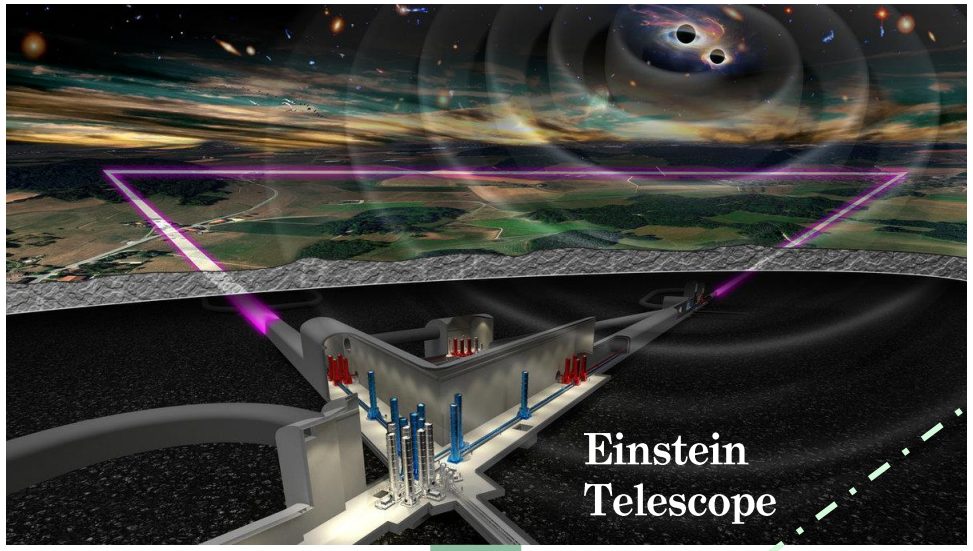
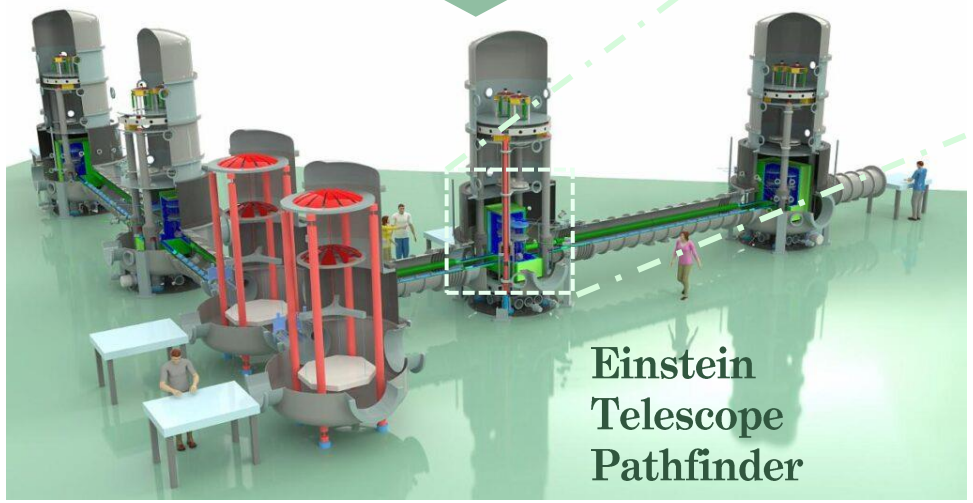
DEMCON kryoz - Zero vibration cryocooling

- Using this technology we are able to create pictures like….

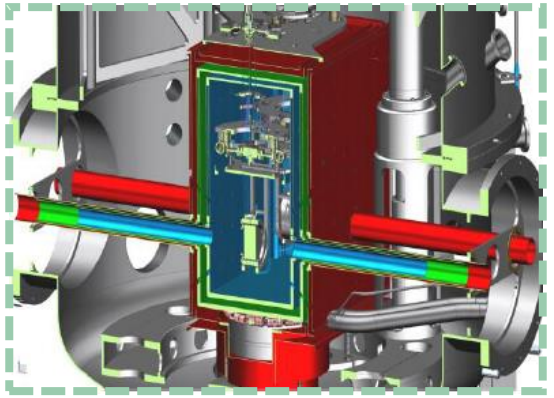


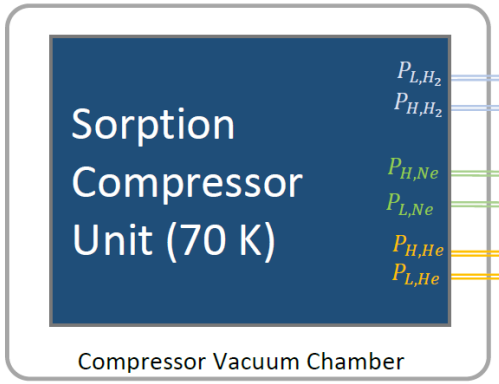
Technology Domain 1 – Vibration free cooling

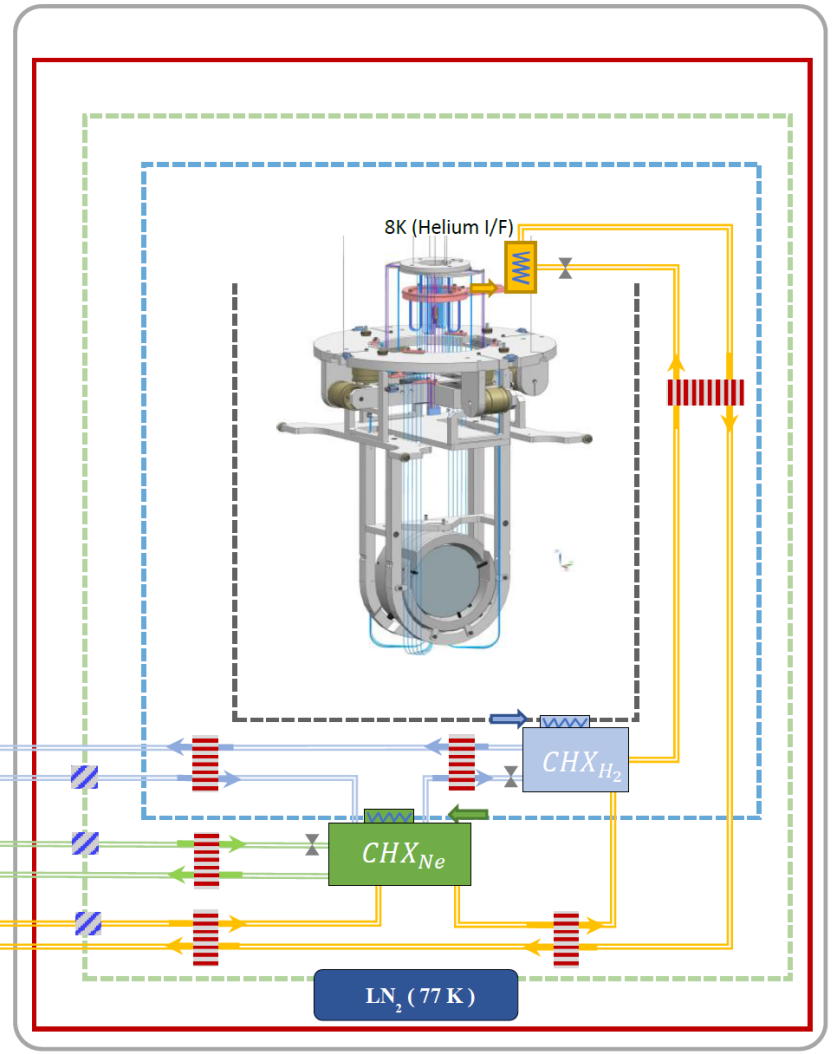




Sorption-based
Vibration-free cryocooler







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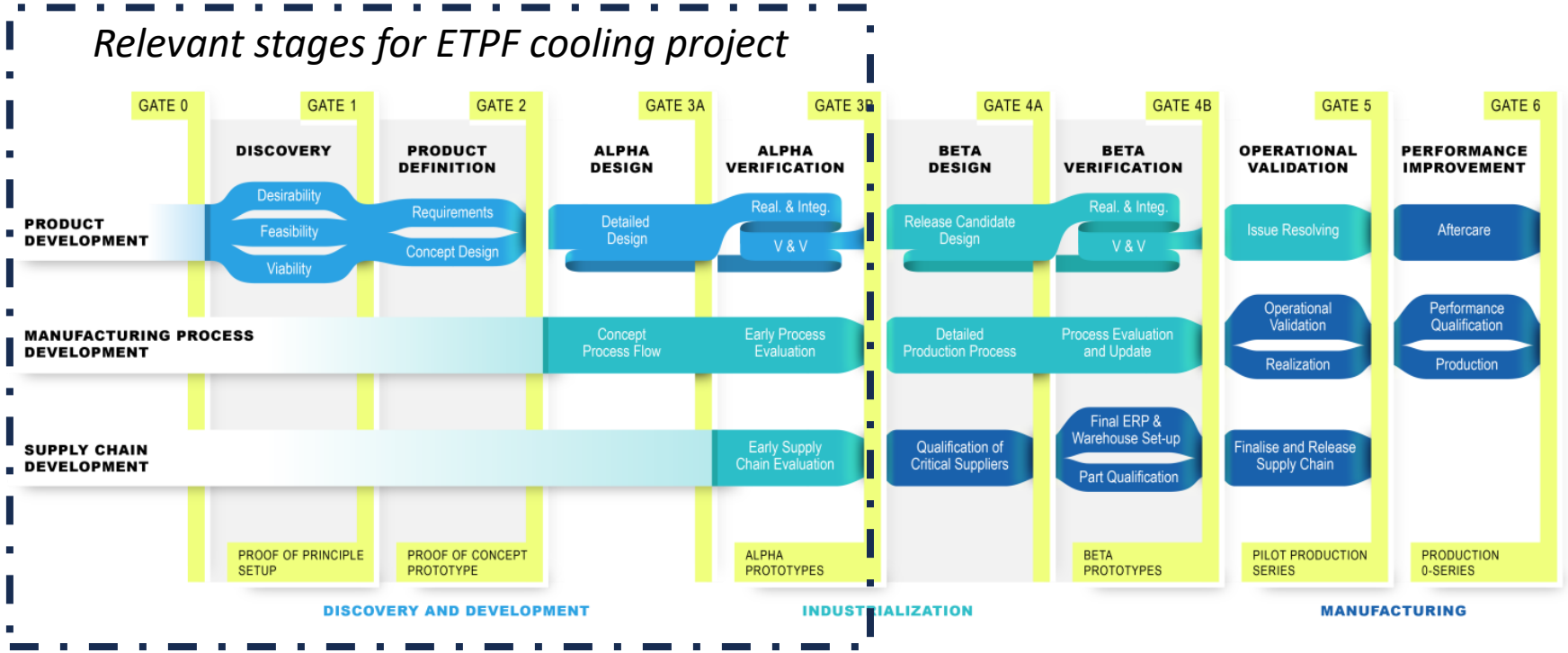
Project approach

We try to follow (as much as possible) our industrial product development and industrialization stage-gate model.



Planning

Feasibility study & cooler concept design finished

Detailed design finished

Cryocooler functional @Twente

Cryocooler verified @Twente

Cryocoolers integrated @Pathfinder

01/24 Start project

07/24

01/25

11/25

07/26

10/26

Finish project

Design and analyses

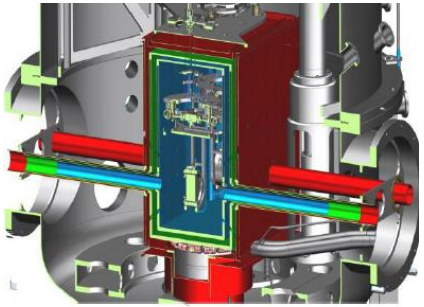
Integration & submodule verification @Twente

Verification @Twente

Integration @Pathfinder

Verification @Pathfinder

01/27



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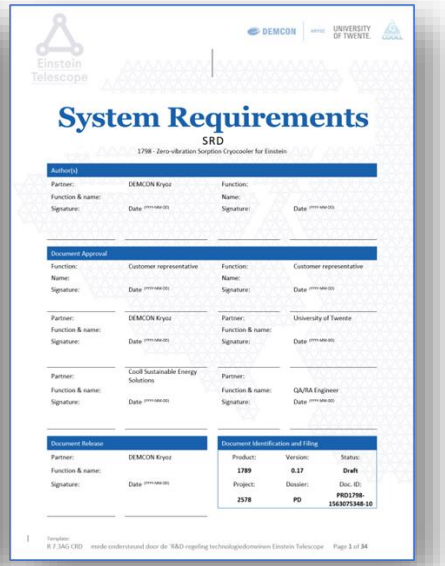
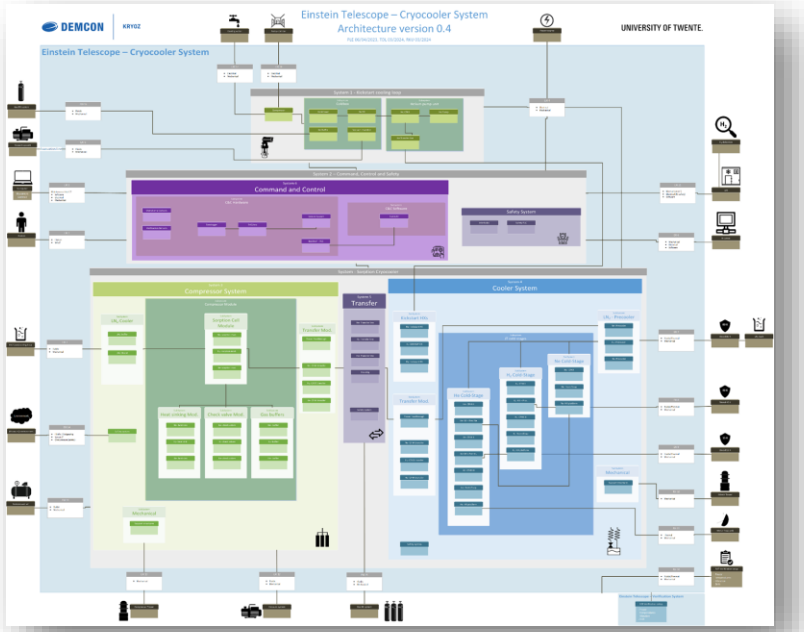
Status

Requirements / Specifications / Traceability

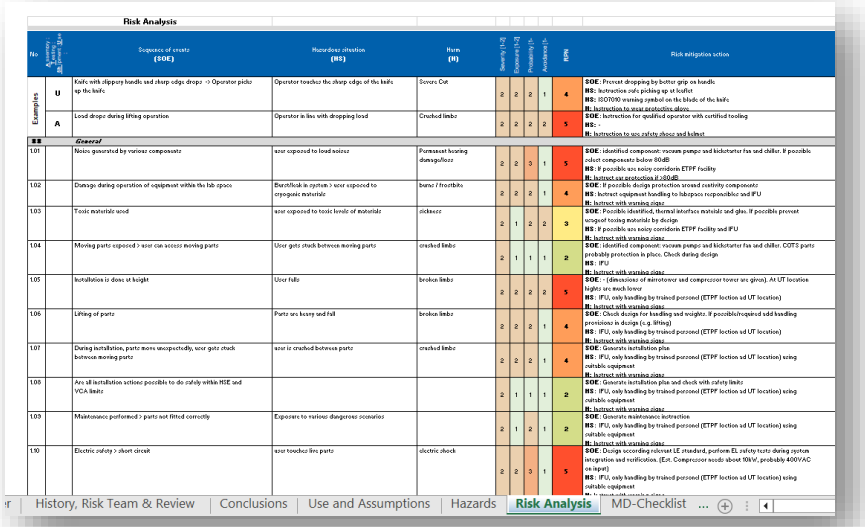

Customer Requirements
CRD
1798 - Zero-vibration Sorption Cryocooler for Einstein


System Requirements
SRD
1798 - Zero-vibration Sorption Cryocooler for Einstein

System Architecture and Use Cases



Risk Analyses and Management


Risk Analysis
History, Risk Team & Review | Conclusions | Use and Assumptions | Hazards | Risk Analysis | MD-Checklist

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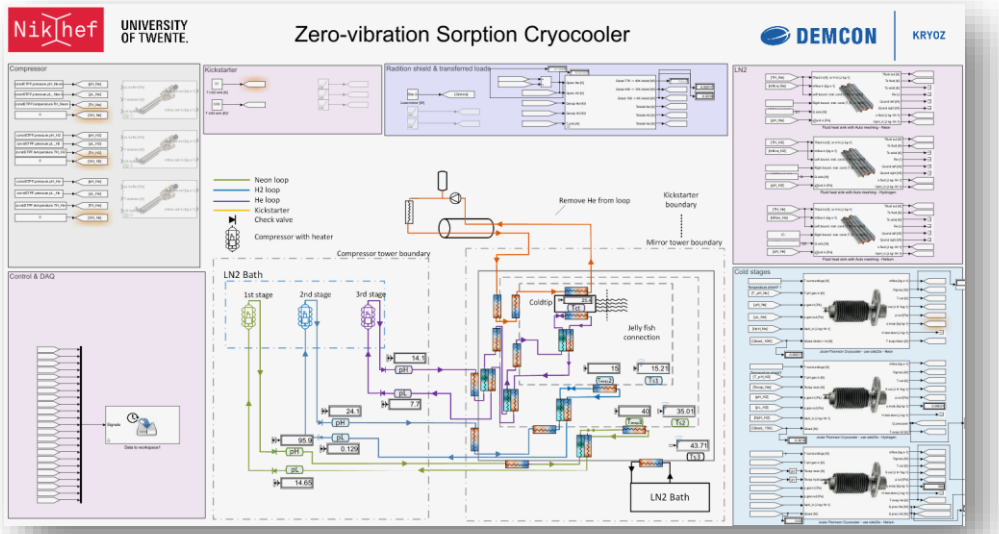
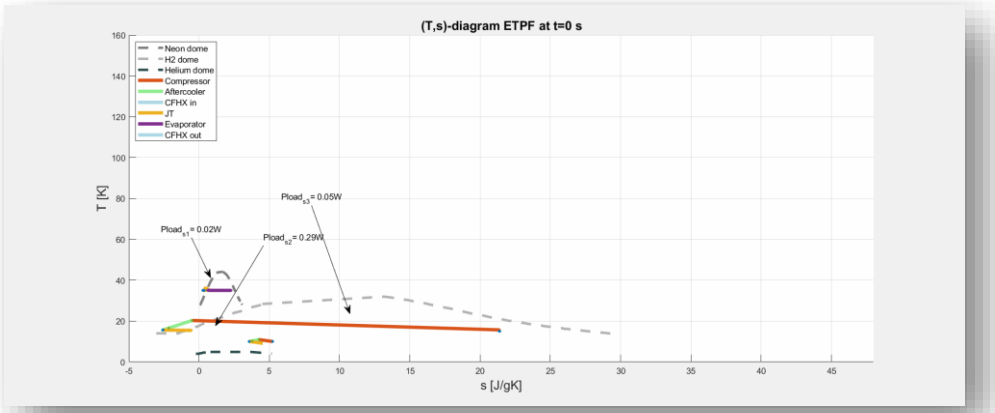
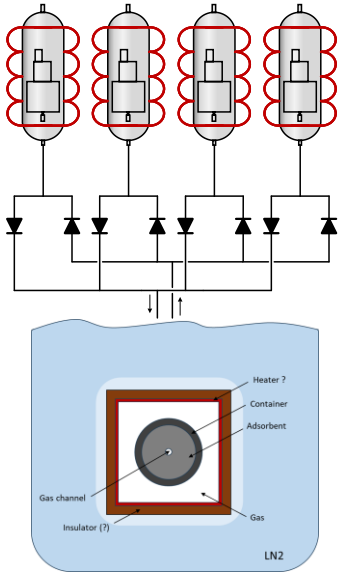
Status

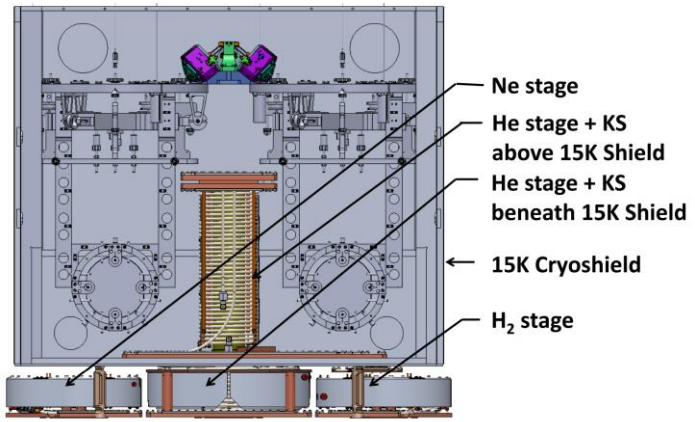
Full system – Simulations and analyses







Design – Concept & Detailed



Feasibility Analyses

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Status

Critical function testing

Maastricht University

Verification / Validation
Test facilities

UNIVERSITY OF TWENTE.

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Status

- In closed collaboration with other stakeholders (Umaastricht & NIKHEF)

Organization and collaboration

1. Regular contact and collaboration (tech weekly, PM bi-weekly).
2. Generated PBS and defined responsibilities.
3. Consortium data sharing – (Sharefile, Teams, DMS).
4. Workshops, STAC meeting, visit ETPF site and ET-Liege.

Why DEMCON kryoz is interested in ET

- As DEMCON we are always interested in joining these “man-on-the-moon” type projects
- Broaden and strenghten national / international cryogenic network
- Interest in (ET) technologies and specific (cryo) technology development for other (commercial) applications

Valorization value

Spin-off opportunities

10 Kelvin sorption based vibration free cryocooling

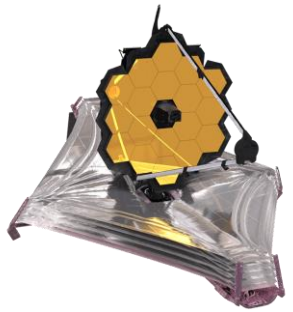
Life-sciences & material research

Sample research at (extreme) low temperatures

Semicon

Cryocooling superconducting devices used in semicon production machines

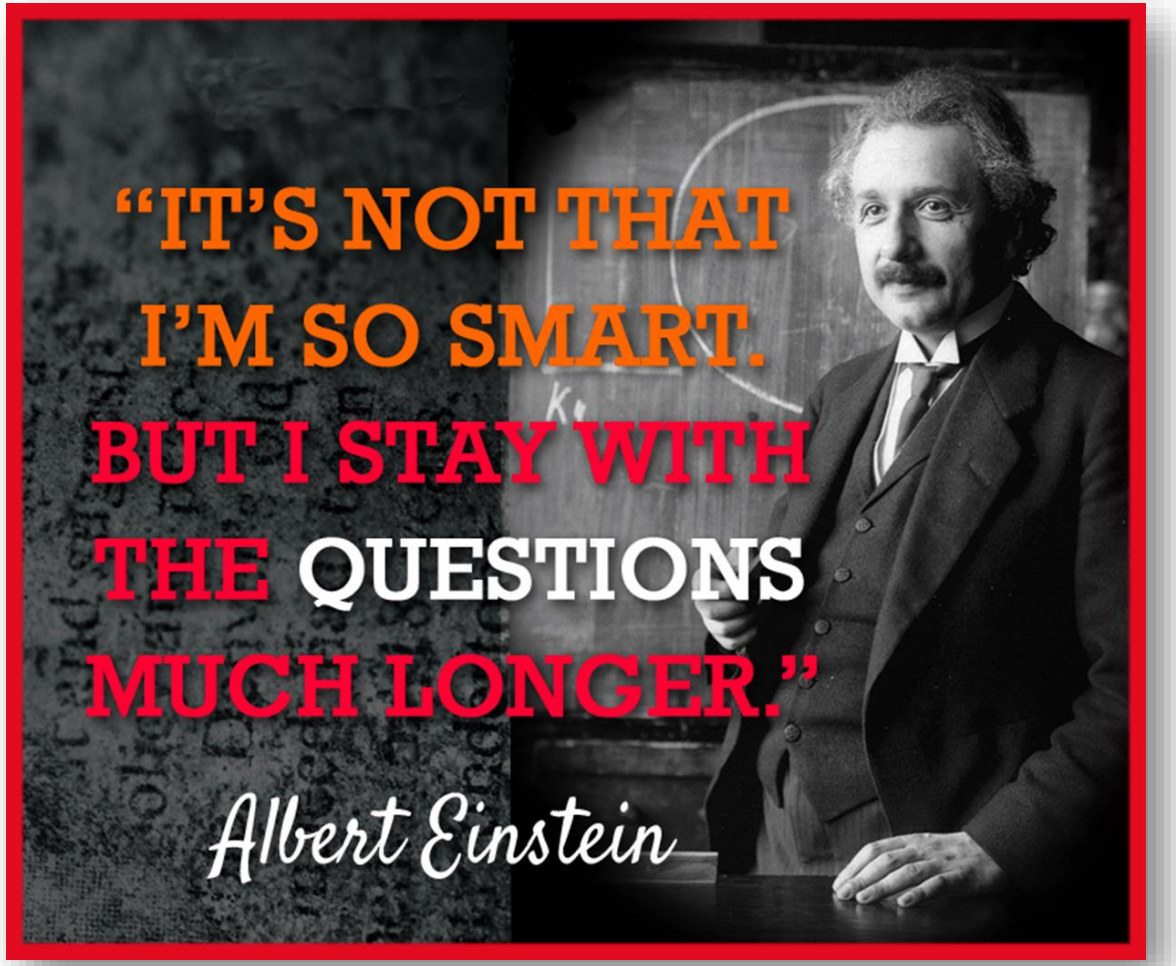
Space



Cryocooled (optical) sensors in space satellites or radio astronomy antennas

Quantum computing

(cost) efficient cryocooling for quantum computers


"IT'S NOT THAT
I'M SO SMART.
BUT I STAY WITH
THE QUESTIONS
MUCH LONGER."
Albert Einstein

Q&A

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