

# Dilution Refrigerators

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February 2026

# Keeping Things Millikelvin-Cool

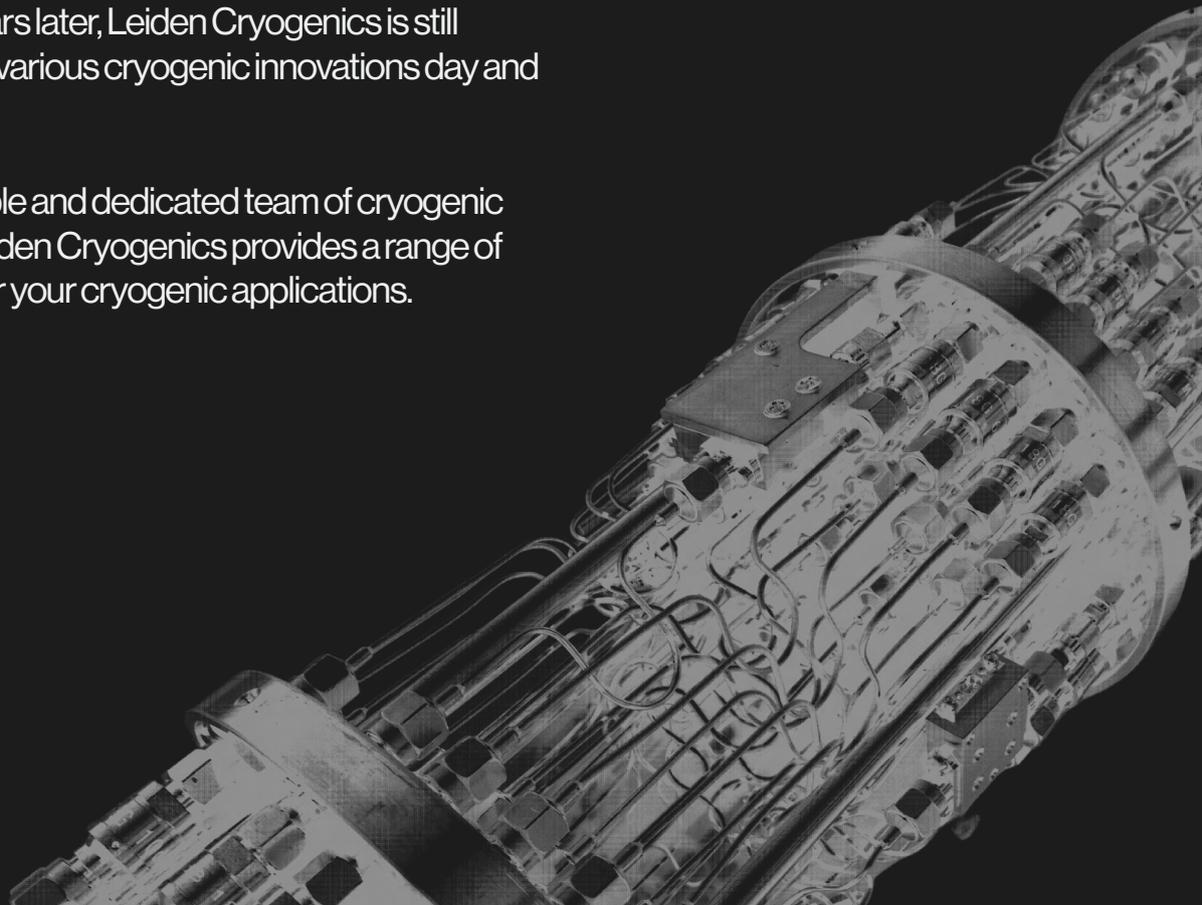
*since 1992*

About  
Quper  
Cryogenic Platforms  
Probes and Semi-Probes  
Representatives

Leiden Cryogenics has been a leader in extreme low temperature techniques for over 30 years.

Founded in 1992 by Prof. Dr. Giorgio Frossati as a spin-off from the University of Leiden, started in a small lab with room for only one dilution refrigerator. Now 34 years later, Leiden Cryogenics is still working on various cryogenic innovations day and night.

With a flexible and dedicated team of cryogenic experts, Leiden Cryogenics provides a range of solutions for your cryogenic applications.



# QUPER

We are proud to announce Quper, our fast-turnaround inverted dilution refrigerator, with ergonomic tabletop access. From hot to cold and back again in under 24 hours – no LN2 required, perfect for rapid qubit testing.



$T_{min} < 25 \text{ mK}$   
 $Q > 300 \mu\text{W} @ 100 \text{ mK}$   
Turnaround Time < 24 hrs  
Mixing Chamber  $\varnothing 200 \text{ mm}$   
Volume Helium 3 < 10 L  
Up to 36 Semirigid RF  
Over 100 High Density RF  
OrangeQS FLEX compatible

## Key Features

Tabletop Access

Fast Turnaround Times

Compact Design

# CF-CS-XXL

When you need the most powerful system on the market, with 3000 microwatts of cooling power, 4 pulse tubes and a plate diameter of 1 m – you'll be on the cutting edge of what's possible.



$T_{min} = 5 \text{ mK}$   
 $Q > 3000 \mu\text{W} @ 120 \text{ mK}$   
4xPT, 9.4 W @ 4.2 K

Cryogen-free dilution refrigerator  
 $\varnothing 1000 \text{ mm}$  mixing chamber plate  
Mass > 2.5 tons  
12x 120 mm LOS ports for semi-probes  
Lifting table for safe single person handling  
Space for over: 600 SMA or 2000 high density RF lines  
LN2 precooling circuit

## System Key Features

### Extreme Cooling Power

Our highly developed dilution unit, in combination with a powerful pumping system, allows us to offer the highest cooling power on the market. The CF-CS-XXL offers 3000  $\mu\text{W}$  at 120 mK, while still achieving a 5 mK base temperature.

### Designed for Quantum

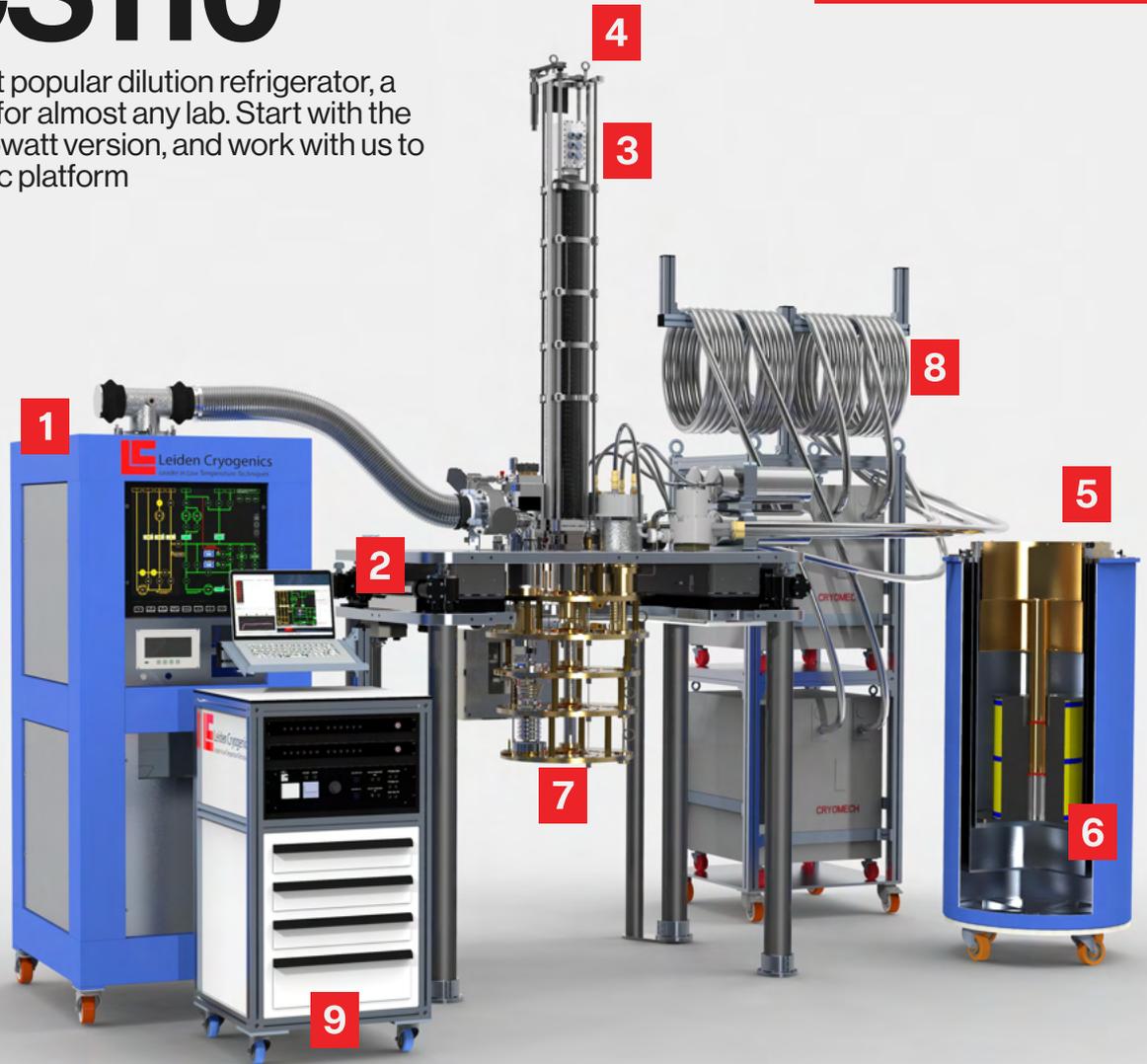
Our XXL line is built for quantum, supporting over 600 SMA or 2,000 high-density RF lines. The 3K plate can be tailored for cryo-CMOS, with the enhanced cooling power of four pulse tubes, and the extra extra large 1 m diameter sample volume.

# CF-CS110

Cryogenic Platforms

Leiden Cryogenics' most popular dilution refrigerator, a true workhorse suitable for almost any lab. Start with the 500, 1000 or 1500 microwatt version, and work with us to build your ideal cryogenic platform

- 1 Gas handling system
- 2 Lifting table
- 3 Cold-insertable probe
- 4 Probe lift
- 5 Vacuum can and radiation shields
- 6 Superconducting magnet
- 7 Fridge plates
- 8 Pulse tube compressors
- 9 Electronics trolley



Ø 490 mm mixing chamber plate  
160 L of sample space  
3-6 120 mm LOS ports for semi-probes  
Central 110 mm LOS port for CIP  
Lifting table for safe single person handling  
LN2 precooling circuit  
Advanced GHS with automation software

## CF-CS100-500

$T_{min} < 10 \text{ mK}$   
 $Q > 500 \mu\text{W} @ 100 \text{ mK}$   
1x PT, 2.35 W @ 4.2 K

## CF-CS100-1000

$T_{min} < 9 \text{ mK}$   
 $Q > 1000 \mu\text{W} @ 100 \text{ mK}$   
2x PT, 4.7 W @ 4.2 K

## CF-CS100-1500

$T_{min} < 8 \text{ mK}$   
 $Q > 1500 \mu\text{W} @ 100 \text{ mK}$   
2x PT, 4.7 W @ 4.2 K

## System Key Features

### Low Vibration Levels

Through our passive and active damping solutions we offer the lowest vibration levels on the market. Ideal for scanning probe applications, such as the AFM-CFM systems of Attocube. Mounted on the fridge itself or a cold-insertable probe.

### Fast Turnaround Times

For rapid cooldown, a nitrogen pre-cooling circuit enables cooling from room to base temp in under 24 hours. While high powered heaters allow overnight warm up. Add a top-loading cold-insertable probe for rapid sample exchange, from room to base temp within 6 hours.

### Quantum Prepared

We design and manufacture cryogenic systems tailored for quantum. Our CS110 line supports over 300 SMA or 1,000 high-density RF lines. The 3K plate can be tailored for cryo-CMOS, offering enhanced cooling power and increased sample volume.

### Easy to Handle

Our cryostats are on a motorized lifting table, allowing single user opening and closing of the system in less than 20 minutes – no heavy lifting required. The lifting table spindles can be retracted to decouple the cryostat from lab floor vibrations.

# Probes and Semi-Probes

## Cold-Insertable Probes

Top-loading motorised system  
6 hour rapid sample exchange  
110 mm diameter  
Fully customisable  
Extension into magnet bore  
Fridge wiring clicking option  
Temp difference to MC < 4 mK  
Q > 100  $\mu$ W @ 100 mK\*



## CIP Key Features

### Easy Loading

The motorised probe lift and control software allows single person loading and unloading into the cryostat. Thermalisation is achieved via a pull rod and clamps mounted inside the cryostat, adjusted using a torque wrench.

### Cold Fingers and Clicking System

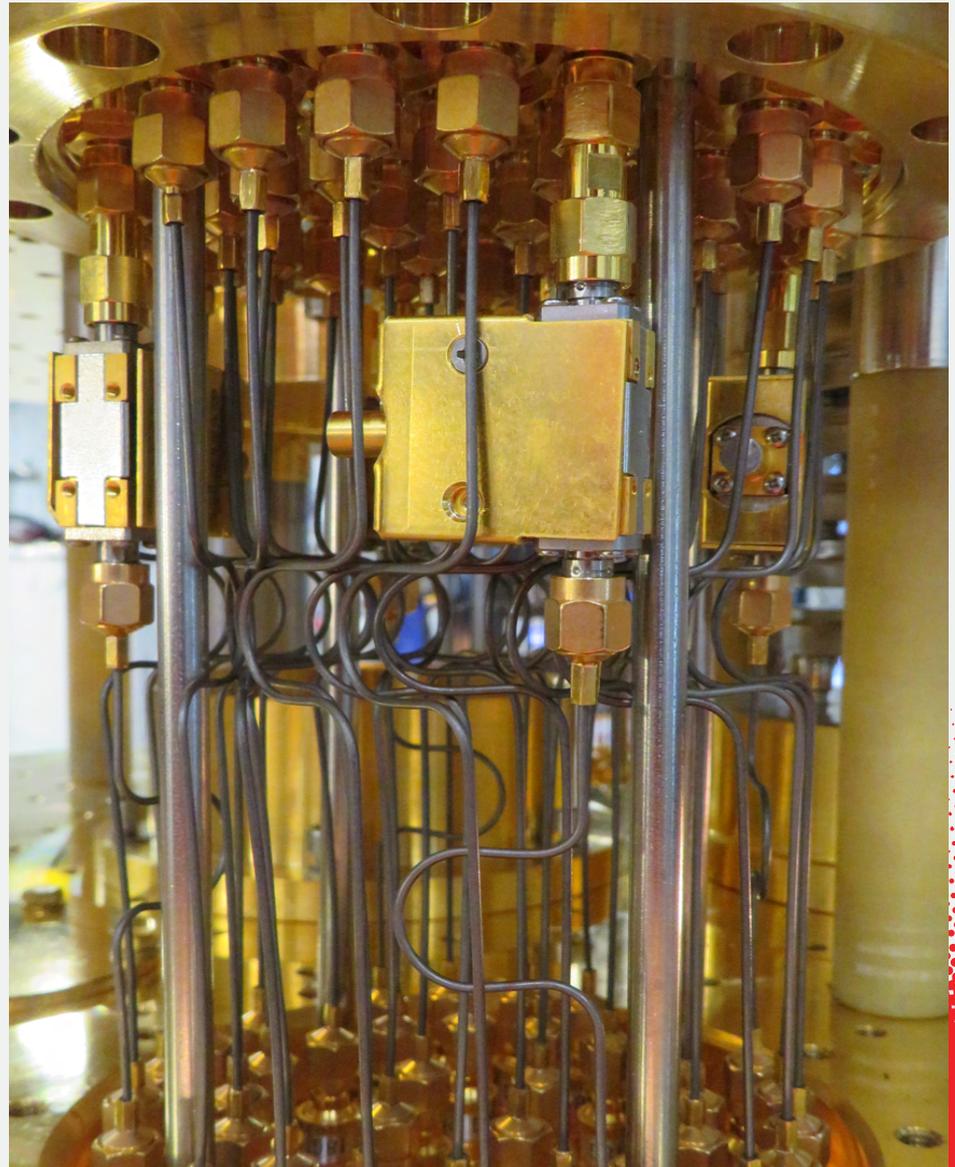
Upgrade your probe with a cold finger below the mixing chamber plate for measurements within the magnet bore. A unique clicking system on the cold finger connects wiring on the fridge to the probe – doubling the available wiring to your sample while lowering heat load.

### Rapid Sample Exchange

Top-loading probes cool from room to base temperature within 6 hours. A wide range of custom wiring, optics, thermometry and cold fingers are available.

## Warm-Insertable Semi-Probes

RT swappable wiring insert  
 120 mm diameter LOS  
 DC, RF and optical options  
 Passive and active components  
 Optical fibre/window options  
 High-density RF options  
 Single screw plate clamping



## Wiring and Customisation

### Hassle-Free Wiring

With SMA, SMP or K connectors, including breaks at each stage to future-proof your setup. Standard wiring up to 18 GHz, with upgrades up to 40 GHz available. Attenuators, filters, circulators, amplifiers and many more RF components are available. DC wiring to bias active components is included.

### Diverse DC Options

Let us prepare your system to your specifications. From our standard low heat-load DC wiring, twisted and shielded to reduce noise, to Thermocoax, flexible coax, low resistivity and high-voltage wiring. Customise terminations and breaks at any plate.

### Window to Low Temperatures

Optical windows and fibre optic feedthroughs can be integrated into our probes and semi-probes. We offer single mode, polarisation maintaining and multimode fibres. Choose from FC/PC, FC/APC, or SMA connectors. Guiding capillaries protect and thermalise your fibres within the probe.

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