

# ° BLUEFORS

Ever wondered how to make something cooler than anything else in the known universe?

We have. So much so that in just 10 years, we have transformed Bluefors from an idea into a market leading company that is focused on helping to solve the most fundamental questions and fascinating challenges at low temperatures. We operate in a world of cold, where laws are determined by quantum mechanics.

As a group of physicists, scientists, engineers, and like-minded professionals, we are curious at the core. Bluefors has one mission: progress.

Our story began with our prototype of a new generation dilution refrigerator, which, for the first time, allowed physicists from different fields to effortlessly and reliably reach temperatures near absolute zero.

Where others would finish, we keep on perfecting. With innovative engineering and impeccable functionality, we combine the highest-end technology with scalable production processes. By re-thinking and pushing old boundaries, we have been able to set a new standard for cryogenics.

Now, Bluefors is the world's leading manufacturer of ultra-low temperature dilution refrigerators.

But we are only getting started. We are here to refine our technology even further and make it readily available on an even larger scale. We are here to enable the quantum technology breakthrough, to support scientists and industries to go further, to allow new innovations, and to grow our global community. For this, and to help you create something new, we have brought together the best minds.

What we did with dilution refrigerators has already transformed the research community, and soon it will transform industries and our everyday lives.

**Bluefors – Cool for Progress.**

**You're always welcome to contact us with any questions:**

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## SPECIAL SYSTEMS

### **LD/XLD-4K and LD/XLD-HE**

These entry level systems provide a LD/XLD cryostat without a dilution unit. Allows experiments down to 3K or 0.5K, with the possibility of upgrading to a dilution refrigerator at any later stage. All options, e.g. magnets, wiring and vibration isolation, are available for the entry level systems. Upgrading to a full LD/XLD dilution refrigerator only takes 3–4 days on-site installation.

### **XLD1000**

For demanding experiments which require the highest cooling powers, Bluefors offers the XLD1000 system. These systems come with a base temperature typically below 7mK, and cooling powers above 30μW at 20mK and above 1mW at 100mK. This allows above 300 factory installed semi-rigid RF coaxial lines.

### **Horizontal model LH**

Low-height, compact, and truly horizontal dilution refrigerator system capable of operation under different tilt angles. Ideal for beam line, telescope or detector experiments.

### **LD250S/400S**

The S version systems are dilution refrigerator systems where the step heat exchangers have been omitted. The base temperature is below 35mK and the system still benefits from the same cooling power at 100mK as the LD250/400 systems.

**Cool for Progress.**

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**CRYOGEN-FREE DILUTION REFRIGERATOR SYSTEMS**

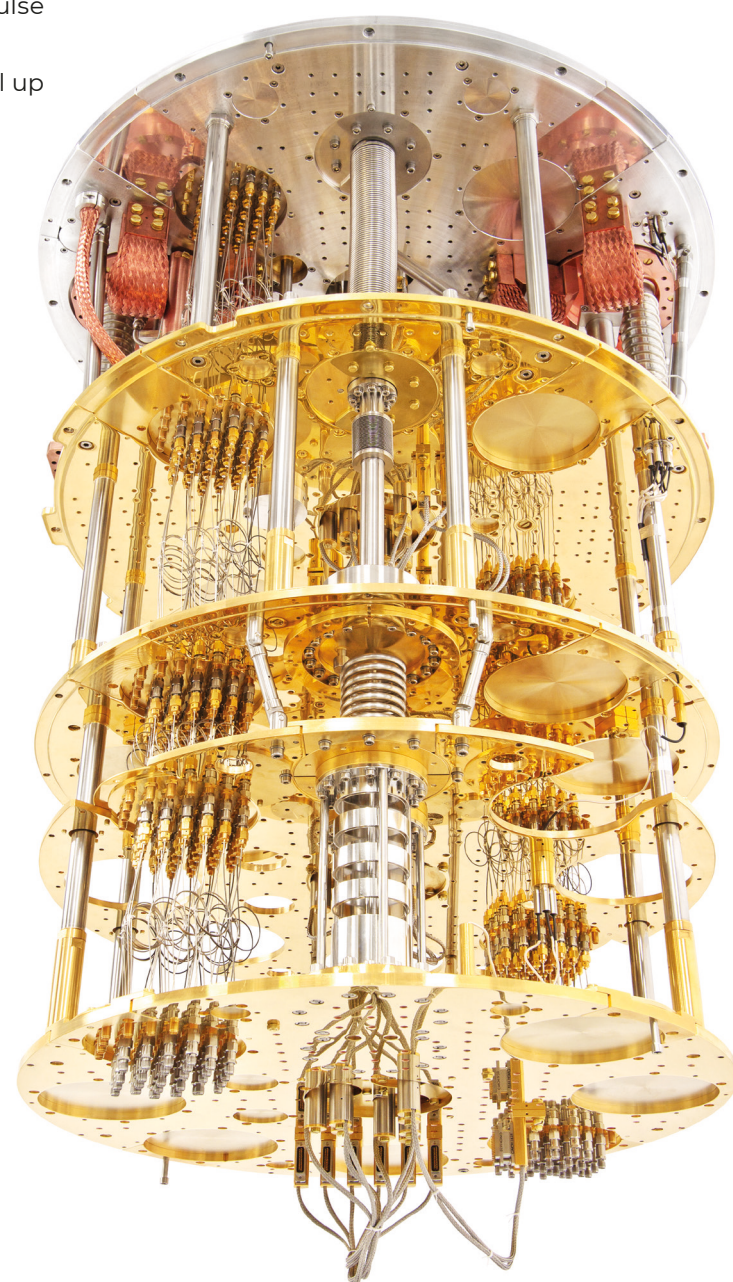
# XLD SYSTEM

## For the Most Demanding Experiments

- Six ISO-K100 line-of-sight access ports from room temperature to the mixing chamber
- Very large experimental space:  $\varnothing$  500mm / 20"
- Easy to operate with fully automated cool-down
- Base temperature well below 10mK
- Cooling power for XLD400:  $>15\mu\text{W}$  at 20mK with only 18L of He-3
- Available also as a special XLD1000 high-power version
- Extremely fast cool-down time with two pulse tubes:  $<24$  hours to  $<10\text{mK}$
- Low cost of ownership with service interval up to 3 years

### Unique Wiring Capabilities

The standard XLD can accommodate over 200 factory installed semi-rigid RF coaxial lines, still reaching a base temperature of  $\sim 10\text{mK}$ .



# LD SYSTEM

## Versatile and Powerful

- Nine line-of-sight access ports from room temperature to the mixing chamber
- Large experimental space:  $\varnothing$  300mm / 12"
- Easy to operate with fully automated cool-down
- Base temperature well below 10mK
- Fast cooldown:  $<24$  hours to  $<10\text{mK}$
- Low total cost of ownership with service interval up to 3 years

### High Cooling Power

Bluefors offers best-in-class heat exchangers with superior performance. To illustrate this, our LD400 system typically provides more than  $15\mu\text{W}$  at 20mK on the experimental flange with only 18L of He-3. In addition, it has a high cooling power of  $\sim 0.5\text{mW}$  when operated at 100mK.

### Well-Engineered

Clean and open design, with sensitive parts well protected and out of reach for the user – minimal risk of damage during installation of experimental equipment.



# SD SYSTEM

## Fast Turnaround

- Three line-of-sight access ports from room temperature to the mixing chamber
- Experimental space:  $\varnothing$  150mm / 6"
- Easy to operate with fully automated cool-down
- Base temperature well below 30mK
- Cooling power:  $>250\mu\text{W}$  at 100mK with only 10L
- Fast cooldown:  $<12$  hours to  $<35\text{mK}$
- A fully wired system can have up to 14 coaxial lines
- Low total cost of ownership with service interval up to 3 years

### Compact and Effective

To create a fast turn-around dilution refrigerator, Bluefors has revived the form factor of their first dilution refrigerator. The new SD system requires no lab layout or on-site installation, and with the reduced step heat exchanger stage the required amount of He-3 is only 10 liters, making the system an effective and affordable alternative.

