The Cryo Dweller

Research highlights from inside the cold layer.

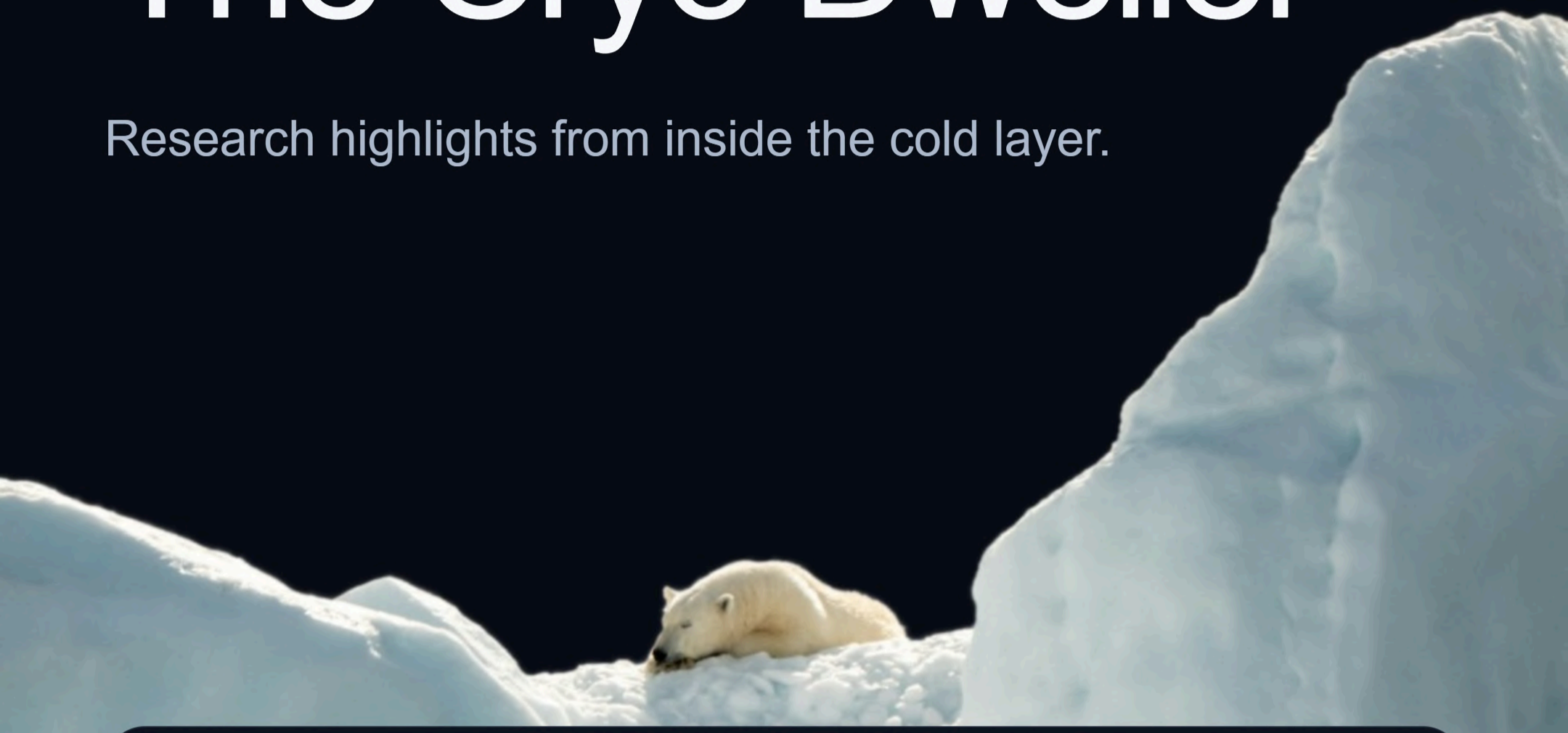

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Photo by Annie Spratt on Unsplash

6 K

THE POINT

One cold chip drove two different kinds of qubit at once.

Niels Fakkel on LinkedIn

WHAT HAPPENED

Diamond qubits normally need two separate sets of control equipment. A Delft team put both drivers on one chip, at 6 K beside the diamond. A possible control path for diamond-based QPUs like Fujitsu's recent tin-vacancy prototype.

L. Enthoven, N. Fakkel, M. A. B. Elbadry, H. B. van Ommen, M. van Riggelen, J. Yun, T. H. Taminiau, M. Babaie, and F. Sebastiano, "A cryo-CMOS electron- and nuclear-spin controller for color-center quantum processors," IEEE J. Solid-State Circuits, early access, Sep. 11, 2026, doi: 10.1109/JSSC.2026.3724484.

4 K

THE POINT

Qubit control signals can travel into the fridge as light, over fiber instead of coax.

Image courtesy Albis Optoelectronics

WHAT HAPPENED

Every qubit is traditionally controlled via coax cable, leaking heat into the fridge. A team in Hefei sent the signals down optical fiber and turned them back into microwaves at 4 K.

Y.-H. Li *et al.*, "High fidelity control of superconducting qubits with optical transmitted signal," arXiv:2608.19602, Aug. 2026, doi: 10.48550/arXiv.2608.19602.

0.6-3.5 K

THE POINT

A chip can help cool itself, built from a metal compatible with CMOS manufacturing.

Fig. from the cited paper

WHAT HAPPENED

The hard part of running electronics in the cold is the heat budget. A Finnish team built a metal already used on normal production lines into a structure that draws heat out of the chip itself.

J. Hätinen, R. P. Loreto, A. Kumar, J. Taskinen, and M. Prunnila, "Electronic cooling of a TiW alloy normal-metal island using Nb-based superconducting tunnel junctions," arXiv:2608.24455, Aug. 2026, doi: 10.48550/arXiv.2608.24455.

70 mK

THE POINT

Testing cold electronics gets a lot faster when the fridge is small enough.

Fig. from the cited paper

WHAT HAPPENED

Reaching close to absolute zero normally takes a day or more. A French and German team built a machine that is as wide as a dinner plate, and makes the trip down and back in two hours.

C. Geffroy, D. Nicolas, E. Eyraud, S. Kumar, S. Mandal, J. Jarreau, L. Kowalski, L. Del-Rey, D. Dufeu, N. Roch, W. Wernsdorfer, Q. Ficheux, and M. Urdampilleta, "An ultracompact dilution refrigerator for fast quantum device characterization," arXiv:2608.18699, Aug. 2026, doi: 10.48550/arXiv.2608.18699.

Thank you.

CRYOGENIC QUANTUM CONTROL | BUILT IN SINGAPORE

Photo by Annie Spratt on Unsplash