

## **Establishment of a National Millikelvin User Facility**

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We express interest in the establishment of a National Millikelvin User Facility to support the development of quantum sensors and related technologies. The operation of sensors and systems at ultra-low temperature is a major growth field, but one which necessarily has a high barrier for entry due to:

- the relatively high cost of equipment, not just for the cooling platform itself but also associated measurement equipment and electronics
- a knowledge gap in the operation and engineering of devices and systems at cryogenic temperatures

In addition, the typical fabrication, measurement and analysis cycle associated with the development of cryogenic devices will often mean that test stands can be idle for considerable periods of time, making the economics of every PI or research group having dedicated research facilities unattractive.

The establishment of a centralized facility would democratize the process of device development by allowing users access to test stands and measurement equipment for a variety of different tests, including but not limited to thermal, RF and low frequency tests. This is particularly valuable at the preproposal and proof-of-concept stages to validate new ideas before committing to full proposals or the expense of purchasing dedicated test equipment. In addition, such a facility would serve as a repository of knowledge of low temperature materials and other specialized information and offer a medium to connect researchers with specialized cryogenic engineering resources. Finally, such a facility is a vital tool for training a future workforce by providing hands-on experience in the operation of cryogenic systems and measurement equipment, typically outside the ability of a University or College level teaching laboratory to provide.

In conclusion, the proposed facility represents a powerful tool for ongoing development of both devices and a future workforce, in addition to enabling the expansion of groups and individuals working in the field, all while aligning with national strategic priorities in the field of quantum science.