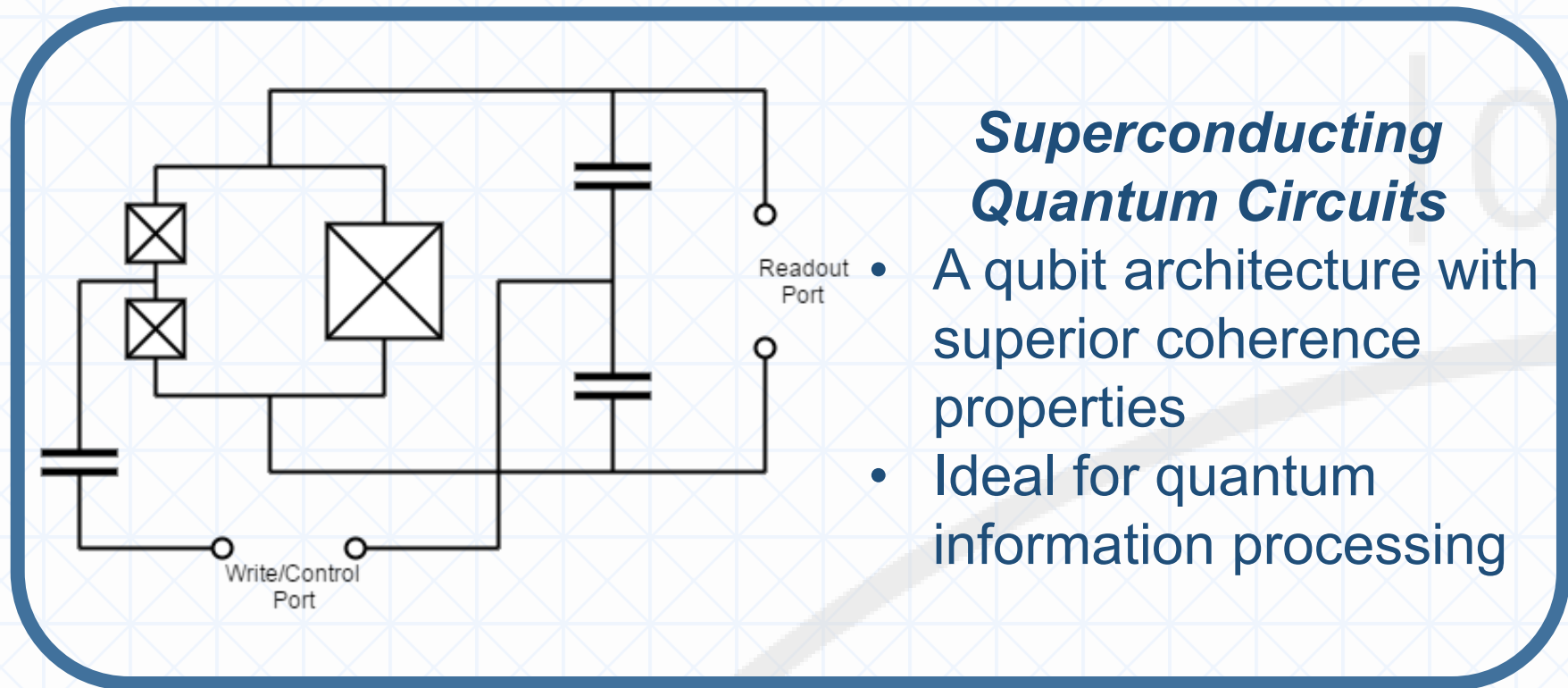


Quantum Computer Design

Supervisor: Prof. Ian Eames

K. Tan, D. Hardej, G. Harker-Smith, N. Sivanathan

UCL



The Quantum Promise

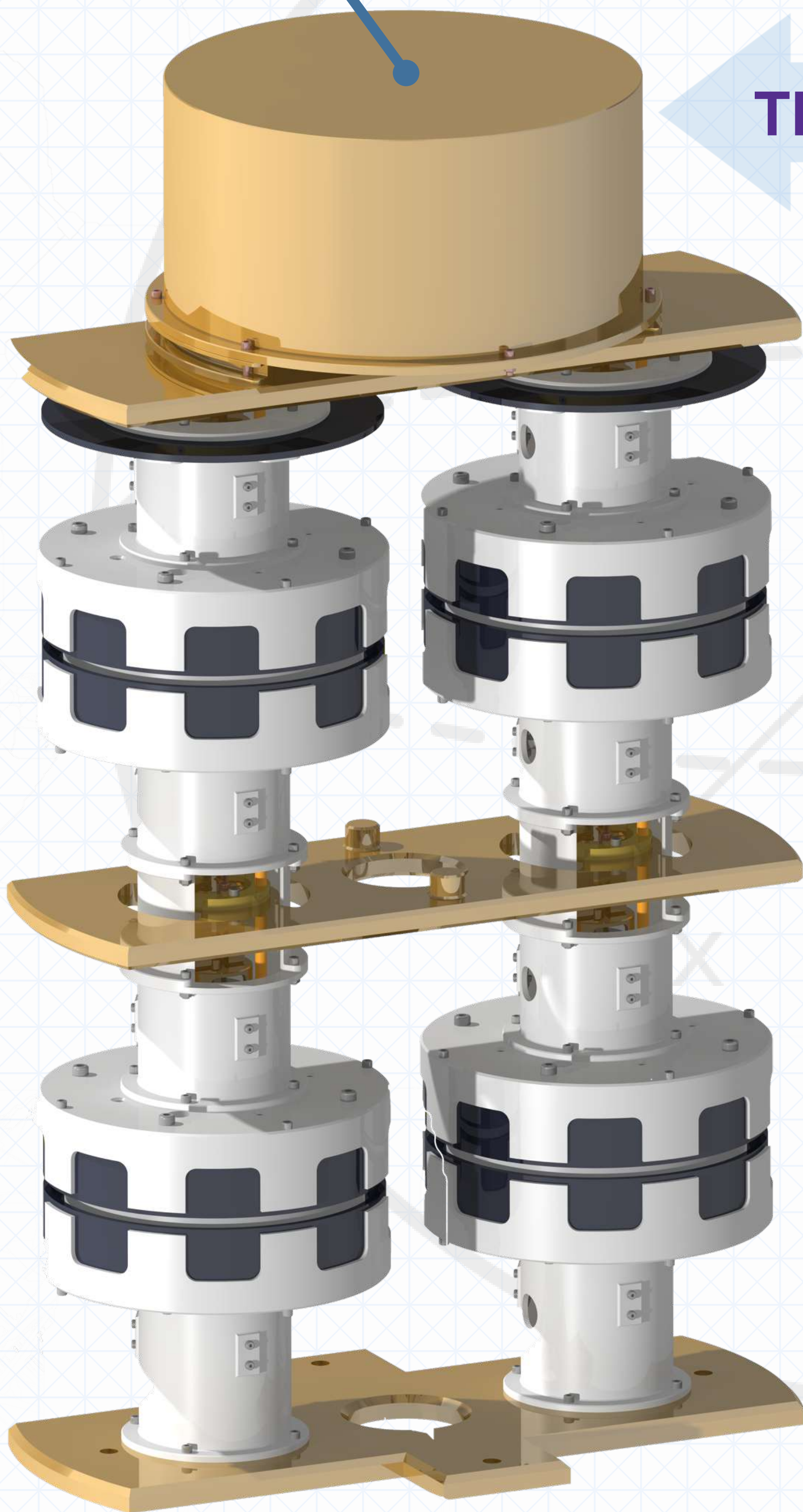
Quantum computers are the future of computing, with the promise to achieve tremendous computing power in many different fields:

Secure computing & cryptography; Machine Learning; Quantum Chemistry and Dynamics; Material Science; Optimisation

The Coldest Point in the Natural Universe

Our unique Adiabatic Demagnetisation Refrigeration (ADR) system can reach temperatures as low as 10 mK (-273.05°C) at the quantum station using Superconducting Magnets and Paramagnetic Salts.

These temperatures are essential to maintain the fragile quantum states used for quantum information processing.



Advanced Thermal buses imbedded in Chromium Potassium Alum (CPA) Salts for conduction at ultra low temperatures

Magnesium Diboride and Soft Iron Shields encase powerful superconducting magnets



Razor-Edge Performance

- ❖ A range of cooling powers and base temperatures
- ❖ Continuous 10 millikelvin cooling
- ❖ Superior quantum control
- ❖ Elimination of electromagnetic interference

ADR Design Advantages

The first magnetic refrigeration system optimised for quantum computing

- ❖ Reducing the cost and increasing the scalability of Quantum systems
- ❖ Space and power savings over dilution refrigerator systems
- ❖ Cost savings over £500,000

Ultra-low Temperatures

Isolation from Radiation & Magnetic Fields

Optimized Quantum Control

Novel Superconducting Qubit Design

Superior Quantum Computer Systems