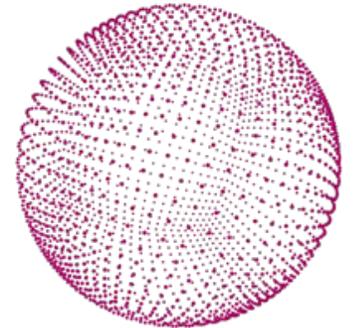
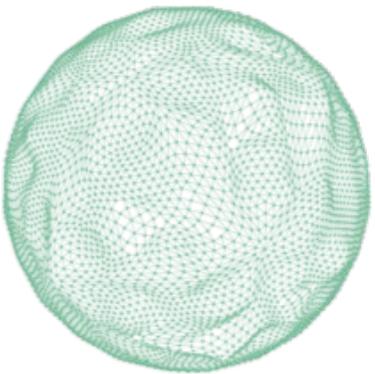
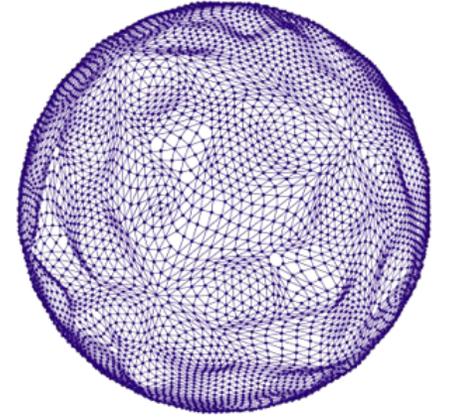
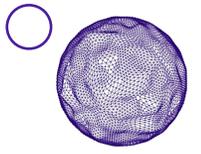


Technology card:

ULTRARAM

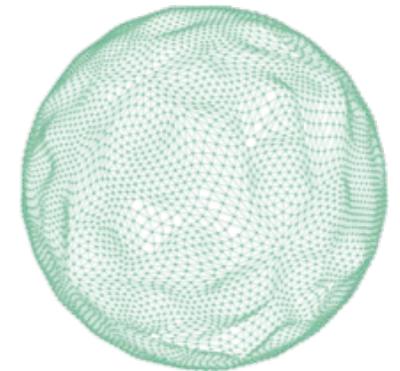
Ultralow-power, Non-volatile,
Random Access Memory.

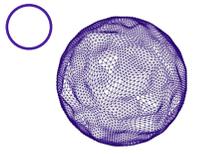




What does it do?

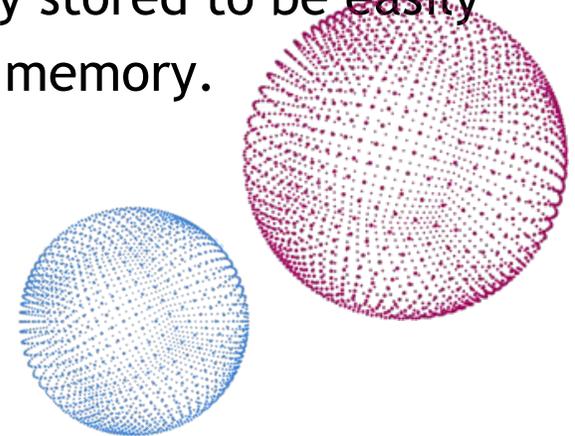
ULTRARAM™ is a patented memory technology that combines the best aspects of DRAM (fast, low switching energy) and flash (non-volatile, non-destructive read) with none of their disadvantages. It has a non-volatile storage time of at least 1000 years, and endurance in excess of 10 million program/erase cycles (at least 100 times better than flash), non-destructive read, low disturb switching energy that is 100 times lower per unit area than DRAM, and intrinsic sub-ns switching speeds.

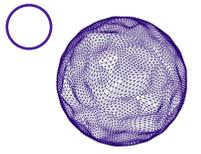




How does it work?

It is a charge storage memory very much like flash, but the oxide barrier in flash that isolates that charge is replaced by a triple-barrier resonant tunnelling structure. Basically, this means that it uses the quantum mechanical process of resonant tunnelling that allows the barrier to switch from opaque to transparent (to electrons) on application of a small voltage. This allows data that is very stably stored to be easily changed on demand, resolving the classical paradox of universal memory.



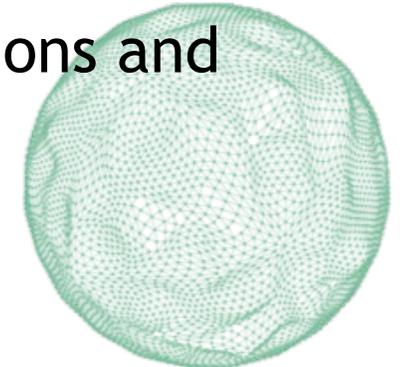


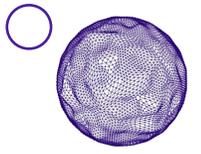
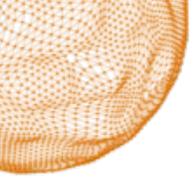
Unique characteristics

- Storage time of at least 1000 years.
- Ultralow switching energy (per unit area).
- High cycling endurance.
- Intrinsically fast.
- The only memory technology with all of the above characteristics.

Domains of impact?

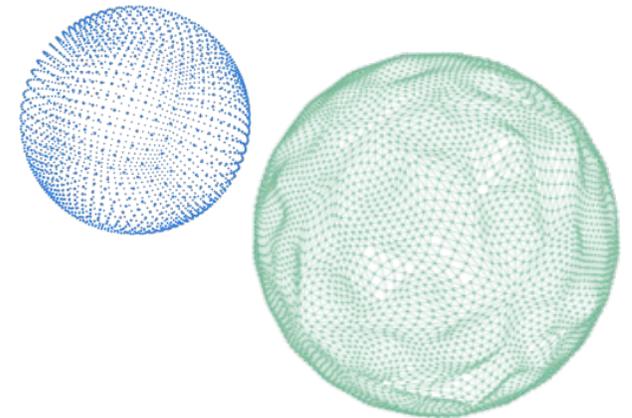
- Any ICT where memory is used, from IoT sensors through to large-scale computing.
- The ATTRACT phase 2 project will focus on space applications and large-scale computing.

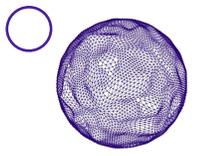




Potential societal issues that your technology can address.

The technology can reduce the massive and increasing amount of electricity used in ICT.





Student contact person and other possible info

- Prof. Manus Hayne
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- Primary location(s):

- Student contact: Lancaster University (Physics)
- Research: Lancaster (UK)

- Information about ULTRARAM:

https://www.youtube.com/watch?v=GxQI0XWaesI&ab_channel=AmazingGadgets

https://www.youtube.com/watch?v=NnAkm7ZEE6w&ab_channel=Padako

https://www.youtube.com/watch?v=N8goWkeBu1w&ab_channel=HusseinNasser



ULTRARAM™
logo

