BUTTON - BOULBY UNDERGROUND TECHNOLOGY TESTBED OBSERVING NEUTRINOS

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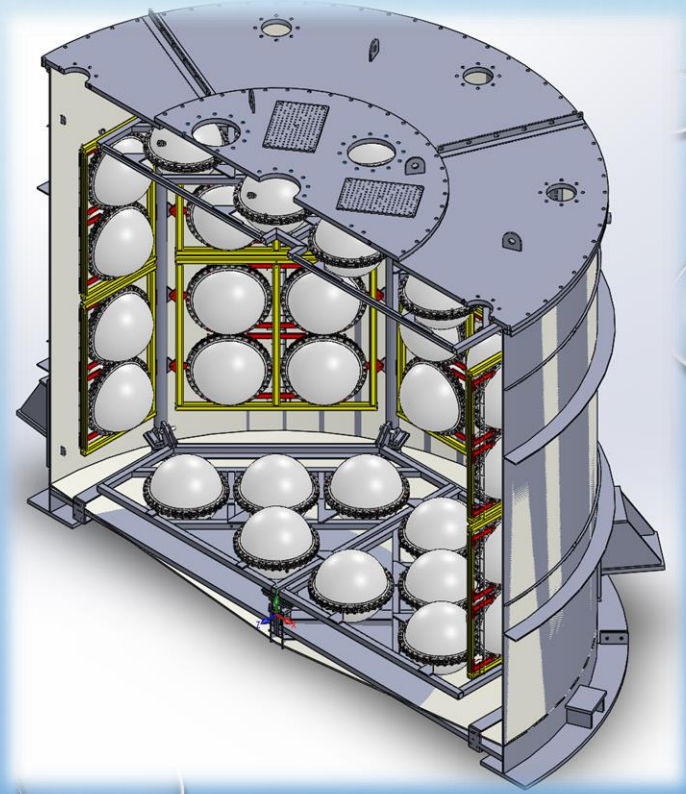
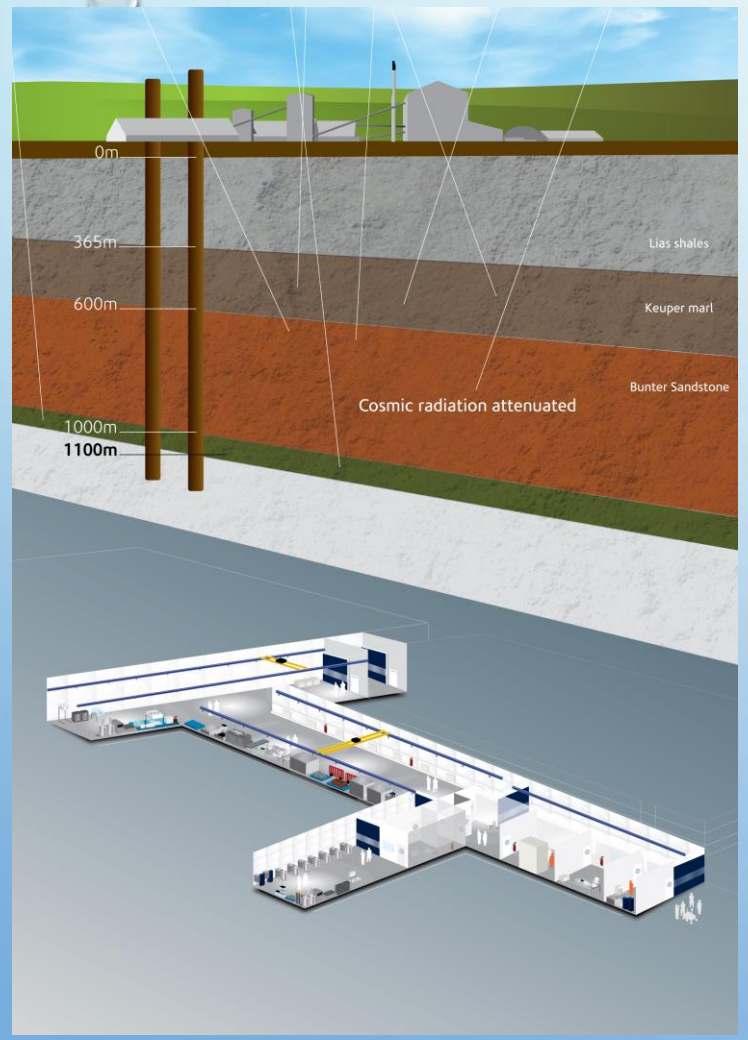


Boulby underground lab



- Boulby provides a very low background location conveniently located conveniently within range of several nuclear sites.
- Being located in an active polyhalite mine operated by ICL-UK over a kilometre under the earth, this location provides good shielding from cosmic rays by a factor of a million compared to “above ground”.

- Boulbys salt also provides a very low background radioactivity with naturally low levels recorded in the lab.
- This same lab has hosted world leading dark matter detectors such as NAIAD and ZEPLIN.

L Kneale:
https://indico.cern.ch/event/1261135/contributions/5333594/attachments/2622769/4535249/BUTTON_technology_testbed_IoP_Kneale.pdf

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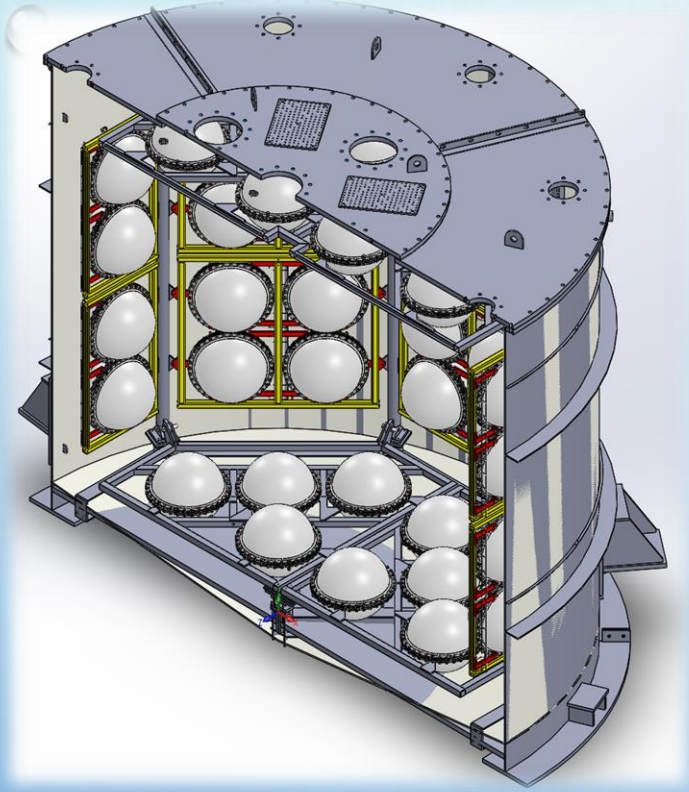
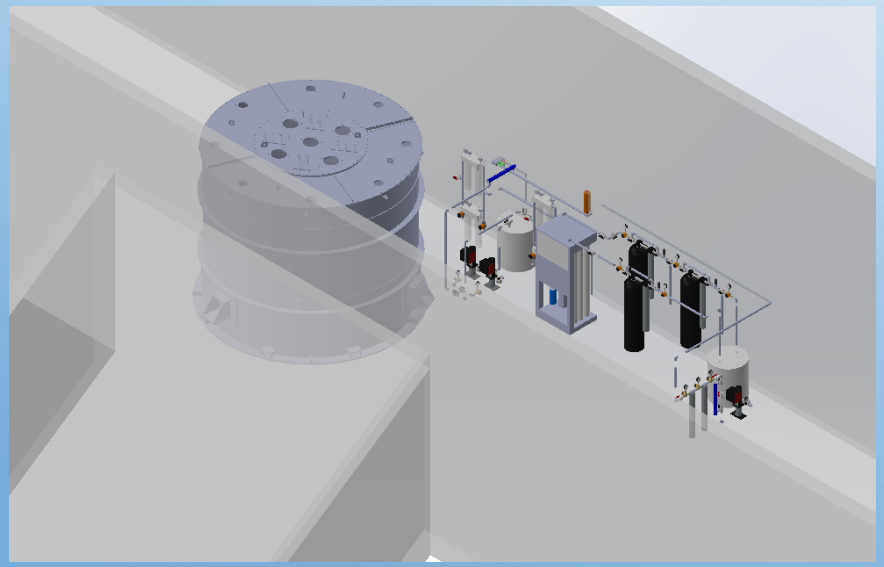


- BUTTON is a low background testbed for development of new and exciting technologies. In it's first iteration it will house 96 Hamamatsu PMT's.
- A modular support structure is employed to allow photosensors to be swapped out when more advanced models become available.
- LAPPD (Large Area Picosecond Photo-Detector) development aiming for 50 ps timing to separate Cherenkov from scintillation is ongoing.
- Acrylic PMT housings, full passivation of the tank and frame as well as careful and critical material choices have been made to "ensure" compatibility with future fill media:
- H2O → Gd-H2O → WbLS → Gd-WbLS → ???

https://underground.physics.berkeley.edu/chess.html

Water system and progress

- Gd doped water handling is non trivial and systems have been developed/are under development currently in America/Canada/Japan.
- WbLS separation/filtration is a further challenge so a flexible and strongly compatible water system is being developed in conjunction with BUTTON.
- BUTTON construction has begun and we expect construction to be finished and first initial data to be taken in the coming year!



Thank you for listening!

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