

Antony Carrington – University of Bristol



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Ratcliffe-on-Soar power station



Last coal fired power station in UK, due to close in Sept 2024

Spherical Tokamak for Energy Production (STEP)

STEP nuclear fusion plant to be built at West Burton

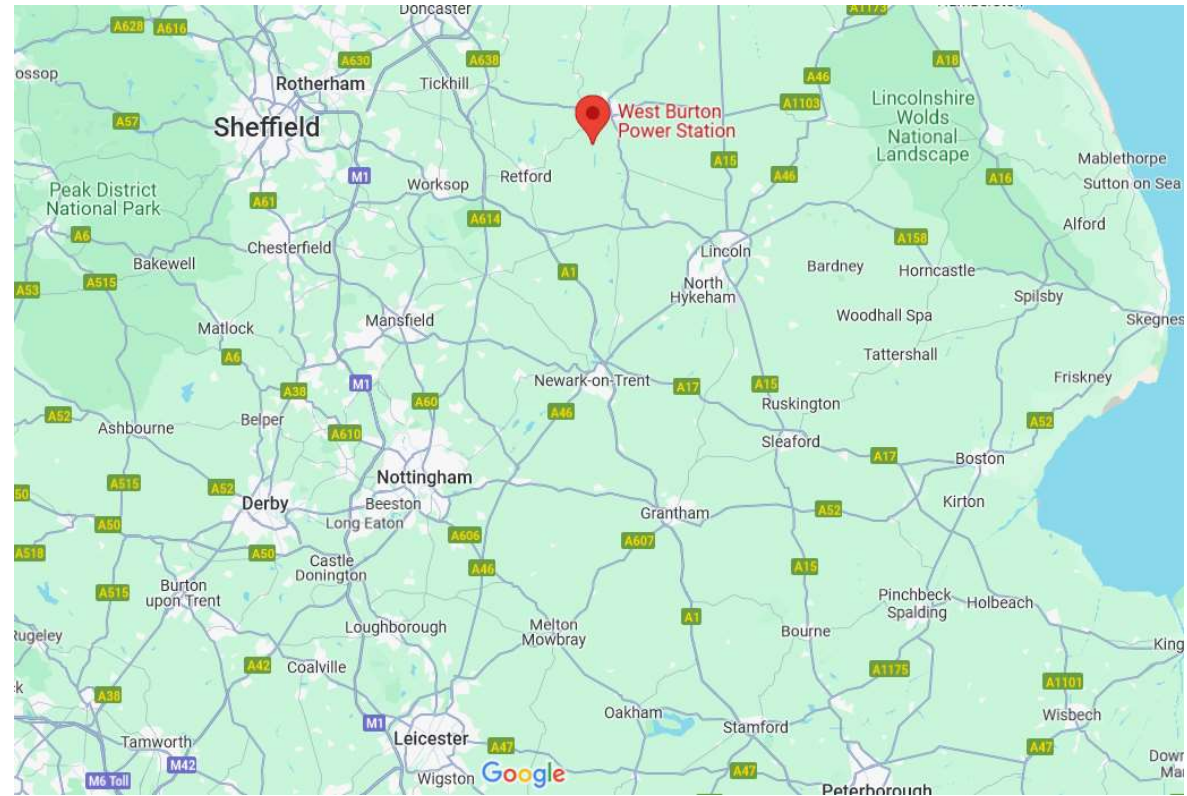
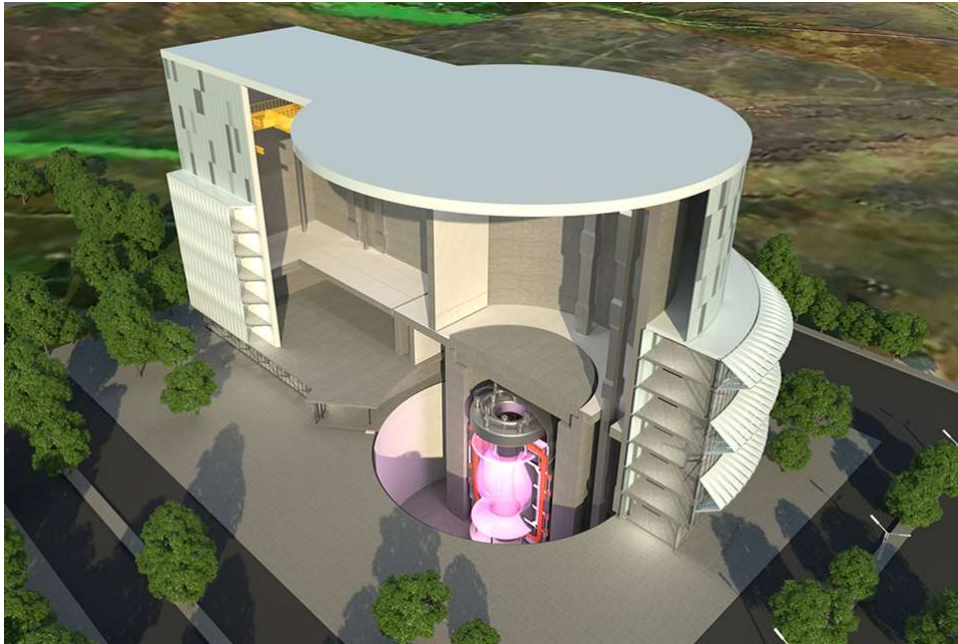
2040 operational date (successor device to the [ITER](#) tokamak)

100 MW electrical output planned

£10b projected cost



UK Atomic
Energy
Authority



PhD level training for 4 or 5 cohorts of 10 – 20 students on a specific topic

6-12 months ‘training’, followed by 3 to 3.5 years research for PhD (4 year total)

Advantages / Features of CDT approach to PhD training

- Students form community: sharing experience and peer-to-peer learning (Cohort Effect)
- Forms HUB for subject area. Workshops, conferences, shared training course
- Concentrates training resources allowing more extensive courses
- Strong interaction with INDUSTRY and Research FACILITIES
- Encourages collaboration between academics
- Delivery of Impact through OUTREACH

History of EPSRC CDTs in UK

Started in 2009. Repeated in 2014, 2018, 2023

This time....EPSRC CDTs

- Approx 350 Outline proposals (number of applications per institution capped)
- 120 proposals invited to full application
- 65 CDTs funded (including 5 AI CDTs)
- £479 million total budget (£7.3m/CDT)
- Results announced March 2024

Subject areas of the 65 funded CDTs

- **Advanced materials and physical sciences**
- AI, robotics, digital security and resilience
- Energy and decarbonisation
- Engineering
- Health technologies
- Information and communication technologies
- Manufacturing and the circular economy
- Mathematical sciences
- Quantum technologies

Superconductivity CDT

- First students will start October 2025
 - 4 yearly intakes, CDT ends in 2032 (up for refunding in 2028)
 - Budget £6.1M EPSRC, £4M Partners: Total £10M
 - Total ~ 60 students
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- Materials
 - Applications and devices,
 - Fundamental Science (experiment and theory)

CDT Management Board



Antony Carrington
CDT Director



Stephen Hayden



John Durrell



Malte Grosche



Amalia Coldea



Susie Speller





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42 CDT Supervising Academics

Materials and Chemistry

Applications and Devices

Fundamental Science: Experimental

Fundamental Science: Theory

Industrial Partners



Magnets for nuclear fusion

HTSC conductors for electrical power transmission

Magnets for MRI

Low carbon energy production / transmission

Advanced Healthcare

Industrial Partners



Superconducting magnet systems, cryogenic systems, and instruments for research and industry



Bulk Superconducting materials

Research Institute Partners



CERN (magnet technology)



Diamond Light Source



ISIS Neutron and Muon Source



Karlsruhe Institute of Technology - KIT

High Magnetic Fields Research centre partners



European Magnetic Fields Laboratory

HFML-FELIX

HFML-Felix : Nijmegen



LNCMI: Toulouse / Grenoble



HLD Dresden



NHMFL : Tallahassee



UK national institute for advanced materials research and innovation



Consortium of European Industrial Superconductivity companies



Oxford Quantum Solutions

Partners for Outreach



CAST - Cambridge



Clevedon School (nr. Bristol)



Bartholomew School Oxford

How the Partners Contribute to the CDT

- Funding and co-supervising PhD studentships
- Hosting 6-week project placements
- Delivering lectures on specialised subjects
- Co-delivering group projects
- Giving careers advice to students
- Contributing equipment and/or materials
- Co-organising workshops and conferences
- Steering the direction of the CDT through Partnership Board
- Hosting and mentoring Outreach activities

Envisaged CDT Interactions with EMFL + EMFL Labs

- Students using EMFL facilities (increased applications/ publications)
- Hosting 6-week project placements
- Co-organising workshops on Superconductivity
- Opportunities for shared training activities
- Opportunities for joint student support

<https://superconductivity-cdt.ac.uk>