

MECHANICAL & AEROSPACE ENGINEERING GRAD STUDENT SEMINAR

A journey to the center of the tokamak: Materials for fusion energy

Wednesday, June 10
2:00 PM
MagLab B101

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The physics of fusion energy generation offers almost unlimited energy output and is based on confining light nuclei at such high temperatures and pressures that they fuse and release energy. However, this necessitates the creation of an environment more extreme than any other on earth. Temperature gradients across tokamak designs cover the range from -269°C (superconducting magnet operating temperatures) to 200 million $^{\circ}\text{C}$ (internal plasma temperature) in a few metres, and the radiation doses and dose rates significantly exceed those experienced by materials in nuclear fission reactors. Added to this, there will be extreme mechanical loading from thermal and magnetic field fluctuations in the plasma as well as possible exposures to highly corrosive coolants. This talk will provide a brief introduction to some of these significant materials engineering challenges and touch on the research and development ongoing in the Materials Science and Engineering team at UKAEA, the UK National Fusion Laboratory.



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