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XLZD@Boulby: The Most Environmentally Sustainable Large-Scale Physics Experiment

Wednesday 9 April 2025 12:15 (15 minutes)

The XLZD experiment will be the largest and most sensitive direct detection dark matter search to date, demanding significant infrastructure and resources. To minimise its environmental impact, preconstruction efforts are underway to quantify, reduce, and offset emissions across the project lifecycle. This includes emissions tracking, sustainable material selection, and for the first time in a large-scale physics experiment, the application of digital twin simulations specifically for modelling environmental impact under various scenarios. These initiatives align with STFC, UKRI, and HMG sustainability strategies, with the ultimate goal of achieving carbon-neutral operations while maintaining the highest scientific standards. By pioneering these sustainability strategies for large-scale physics experiments, XLZD aims to establish a sustainability framework that can serve as a model for future experiments.

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