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## High voltage delivery in LZ

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LUX-ZEPLIN (LZ) is a next-generation direct dark matter search experiment based on a 7-tonne double-phase xenon detector. The large active xenon target brings many benefits, namely outstanding self-shielding of an inner fiducial volume, but also some practical challenges, in particular the need to provide high voltages to sustain the required electric fields. LZ is undertaking a comprehensive R&D programme to address the different aspects involved, such as the development of feedthroughs with a design voltage of 200 kV, aiming for an operating voltage of 100 kV at the cathode electrode. Intriguing phenomenology has been emerging from previous attempts to sustain strong electric fields in ultrapure liquid noble gases, and our programme addresses the physics processes involved at a microscopic level too. Our understanding of the HV breakdown mechanisms will inform the engineering solutions and procedures adopted in LZ. In particular, a test system is being operated at Imperial College to study high field phenomena at the surface of thin metal wires, one of the most challenging aspects of HV delivery to noble liquids.

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