Karlsruhe Institute of Technology

High-voltage Test Facilities Towards XLZD

High-voltage electrodes, spanning 3 m in diameter, will lie at the heart of the XLZD TPC and will play a key role in signal generation and reconstruction; hence, their performance is of paramount importance. A multifaceted R&D program at KIT aims to tackle key challenges associated with the design and construction of such electrodes. To that end, we've developed several test setups aimed at studying and characterizing electrode performance on cm- and m-scales, and we're also working on the development of a full-scale electrode prototype.

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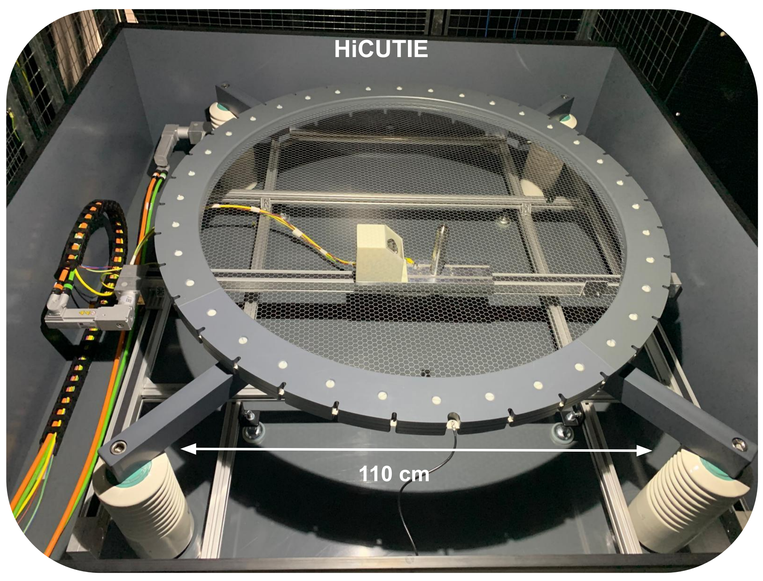
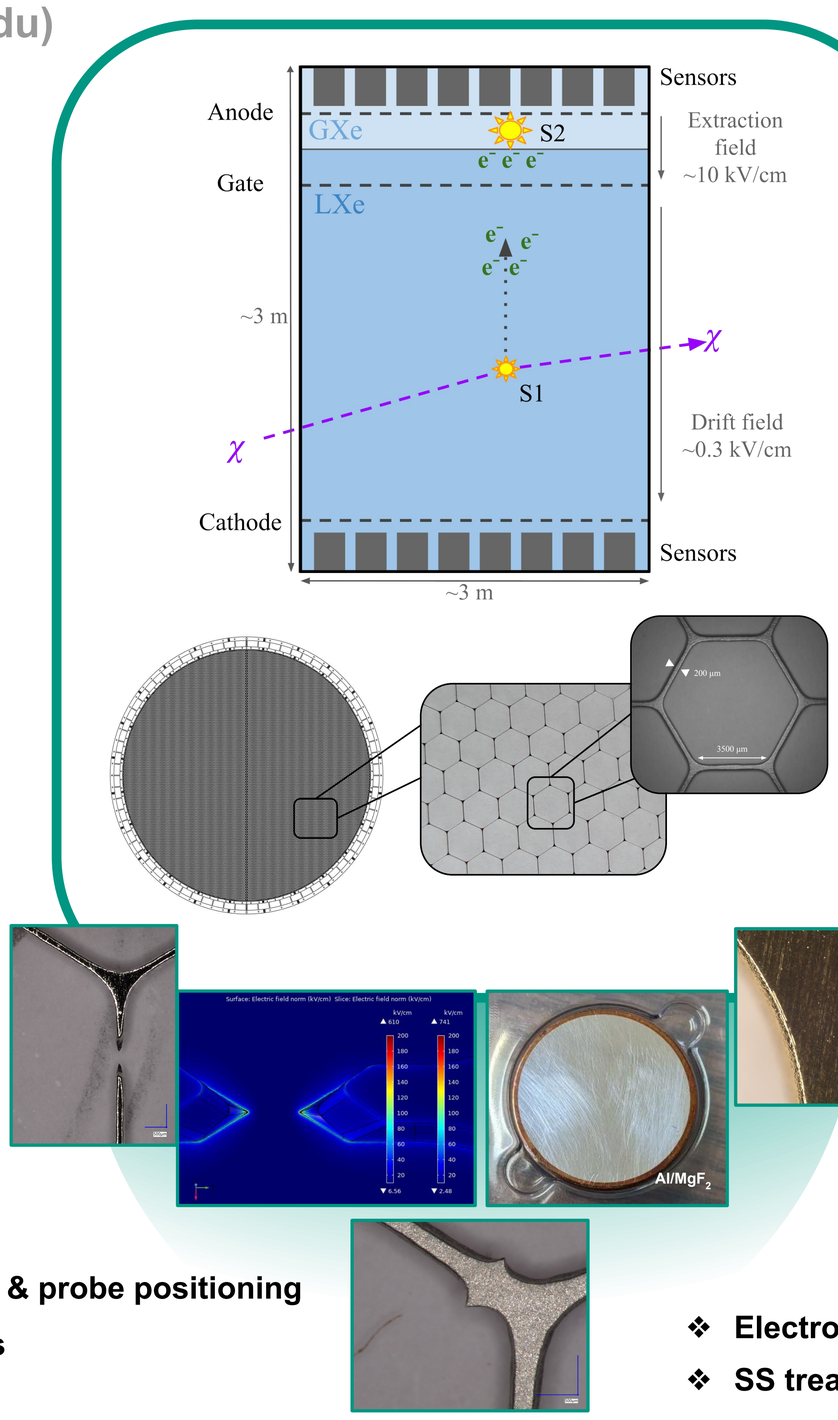
HiCUTIE

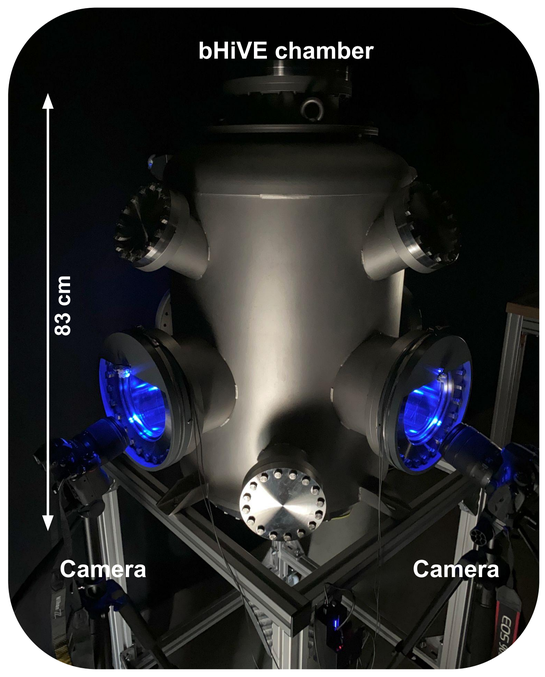
High-voltage Coordinate Unit for Targeted Inspection of Electrodes





bHiVE

bite-sized High Voltage setup for Electrodes



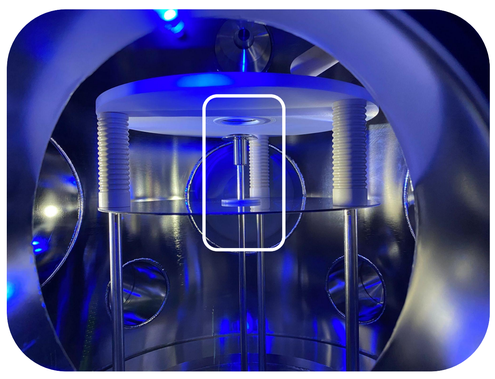
Electrode characterization

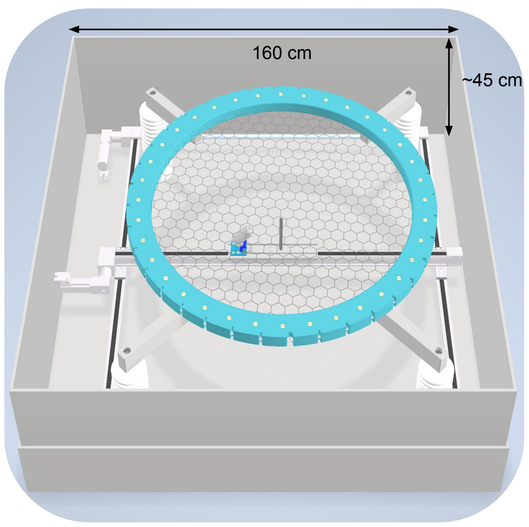
- Prototype (~1 m) system
- Quantify electrode performance in gAr
- Localized HV field & imaging via camera
- Automated, customizable HV schemes, imaging & probe positioning
- **Ongoing R&D:** ~3 m system for XLZD electrodes

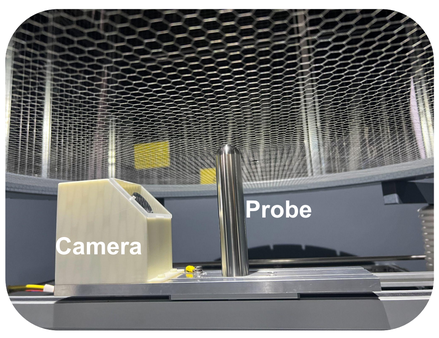
Study, prevent & mitigate

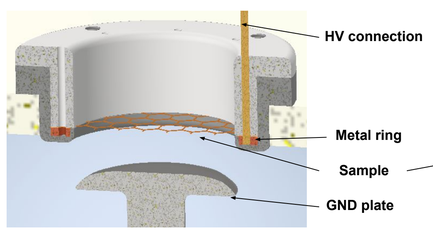
- Pre-breakdown & breakdown events
- Electron emission from electrode samples

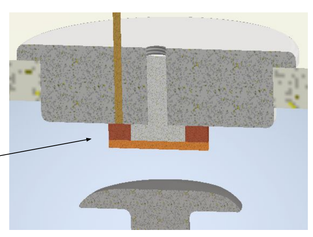
- **Electrode coating** - Au, Cu (MPIK HD), Al/MgF_2 (U. Alabama)
- **SS treatment methods** - citric, nitric acid, etc…



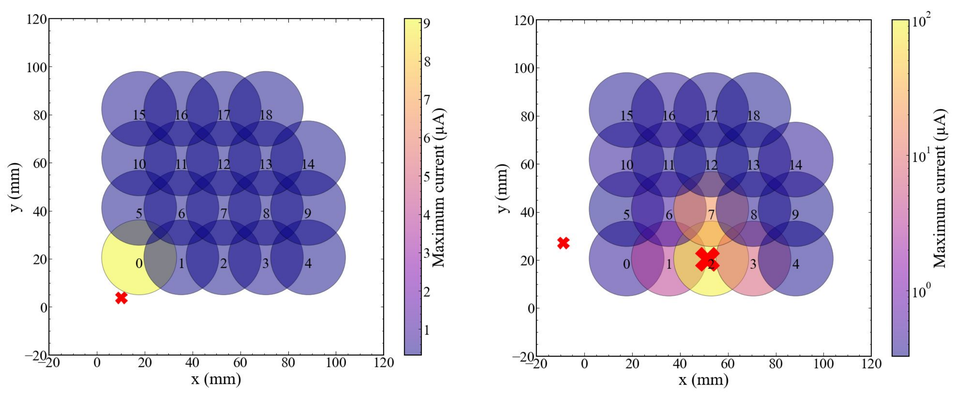


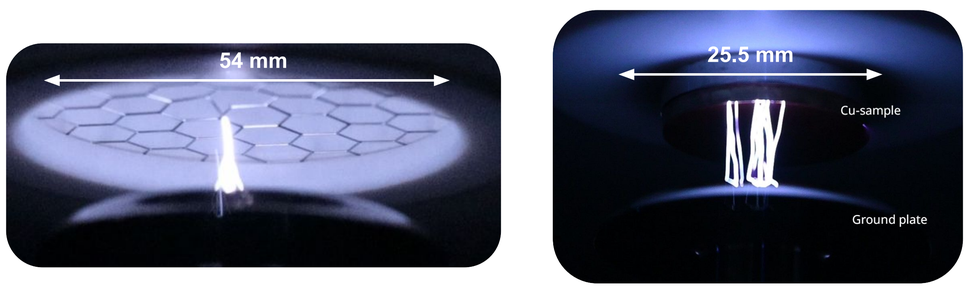






Preliminary Commissioning Results





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