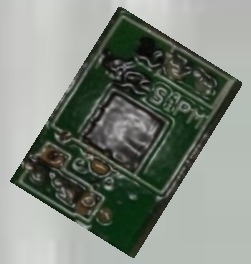

Silicon Photomultipliers for DM Searches with Liquid Argon Detectors

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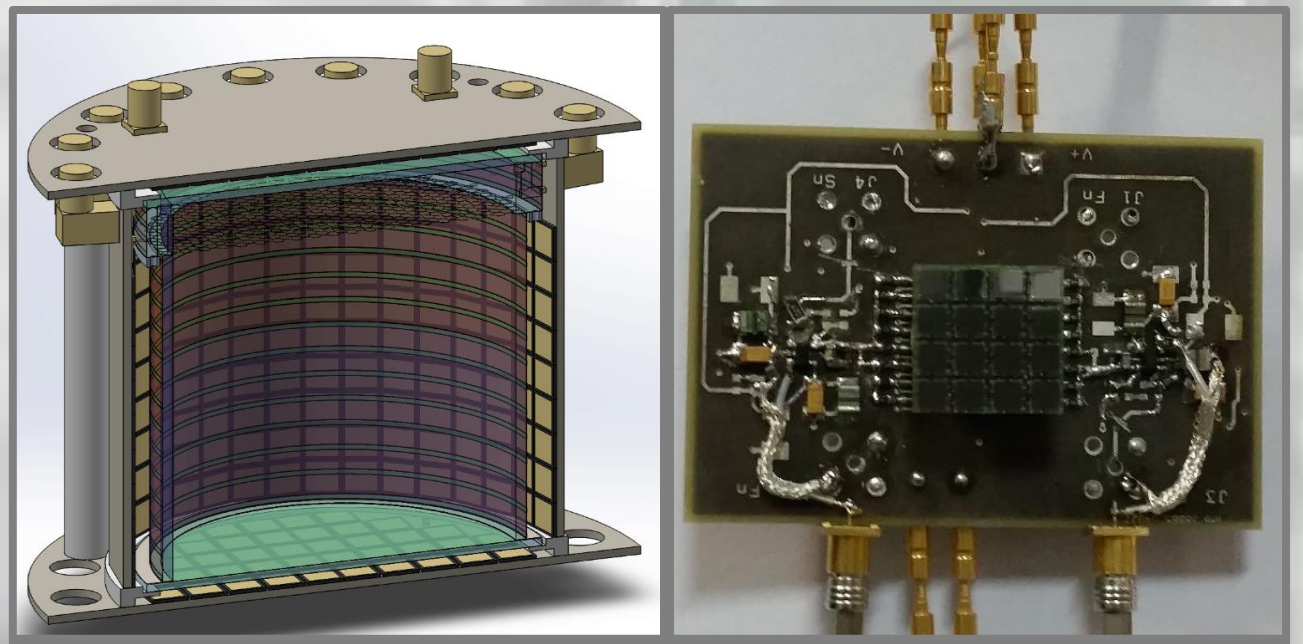
- **Next generation multi-ton scale noble liquid experiments have the unique opportunity to discover dark matter particles at the TeV scale**
- **Requirements for next-gen experiment photosensors:**
  - **Negligible levels of radioactivity**
  - **High quantum efficiency**
  - **High gain**
  - **High single photon resolution**
  - **Fast response**
  - **Large sensitive areas**
  - **Low radioactivity**
  - **Low power consumption**
  - **Low price**
- **SiPM arrays are an attractive solution, with low intrinsic radioactive background and small mass in addition to unrivalled performances in single photon detection.**
- **SiPMs have been proven to perform adequately in cryogenic conditions, and their behavior has been fully characterized.**



a) An illustration of a GAP-TPC utilizing SiPMs for 4π coverage of the TPC
b) SensL-30035-16P SiPM array

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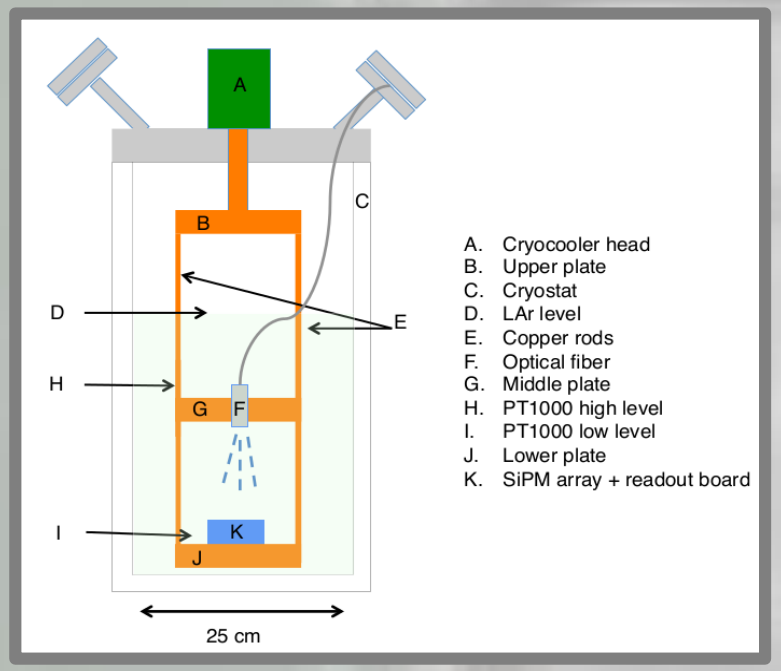

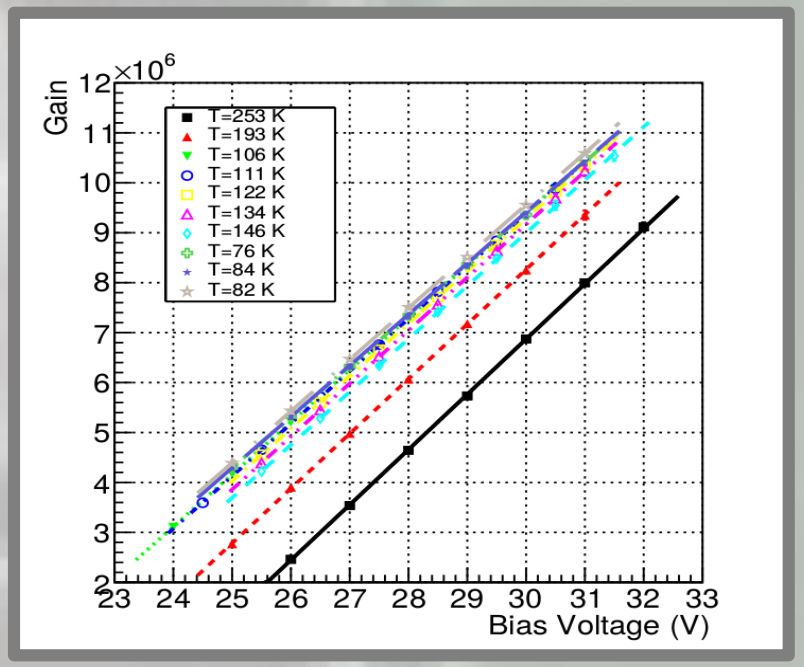

- **SiPMs were tested in cryogenic conditions to assess parameters such as gain, resolution, correlated pulses, after-pulse delay times, quenching resistance, and recharge time.**
- **A SensL-30035-16P array was tested using a special custom-made active front end board near to the array to sum together the signals from the individual SiPM dies.**
- **Initial results are encouraging, showing durability, adequate gain and excellent SPE.**
- **Difficulties with increased recharge time at low temperatures and correlated pulses must be resolved.**