Noble Element Summary

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Summary Talk

- **The noble element group is an active and diverse set of experiments, experimenters, and physics goals**
- Global Argon Dark Matter, XENON1T/nT, LZ, ARIADNE, SBND, DUNE, NEXT, nEXO, COHERENT
- Liquid Xenon, Liquid Argon, Scintillating Bubble chambers, Solid Xenon TPC, Hydrogen doped Xenon TPC, Dual Phase Detectors, High Pressure Gas Noble Experiments
- Extremely low noise CMOS, Ion Detection, Pixel based LArTPCs, Novel UV photon detection, ….
- Neutrino Oscillations, Neutrinoless Double Beta Decay, Dark Matter, CEνNS, Neutrino Interactions, Fundamentals of Noble Element Properties
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Summary Talk

- **These groups face challenging requirements with novel R&D ideas**
  - Extreme Low Background
  - Low Energy Detection
  - UV Light Detection
  - Rare Processes
  - 4D Event Readout (Position & Energy)

When combined gives 5D Readout

- **Many challenges ahead across the noble element experiments which require robust detector R&D program**
  - Challenges of scalability (essential for the next gen. experiments)
  - Challenges of low thresholds (look where we haven't looked yet)
  - Challenges to push to discovery (new ways to detect the undetectable)

Parallel Sessions

- **Day 01:**
  - Dark Matter and Low Threshold Detection
- **Day 02:**
  - New Ideas in LArTPC's
- **Day 03 (Session 01):**
  - DUNE
- **Day 03 (Session 02):**
  - Rare Neutrinos (or the lack thereof)

The Next Steps: Basic Research Needs

- The enhancement and enabling of large scale noble element detectors which fully exploit their discovery potential *(we will improve this)*

Three PRD's for this key challenge

1. Develop large area, high granularity, high efficiency signal collection technologies.
2. Develop noble detector calibration techniques
3. Develop strategies to address known and hidden challenges associated with scalability of future noble element experiments

The Next Steps: Basic Research Needs

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3. Develop strategies to address known and hidden challenges associated with scalability of future noble element experiments

Still time to give input:

- Use this Google Input Form
- Send emails to the conveners
  - (Jocelyn.Monroe@rhul.ac.uk)
  - (guenette@g.harvard.edu)
- Upload to the CPAD Box your one pager

We will be working hard over the next few days to encapsulate your input and advocate for the importance of the R&D going on in the Noble Element community

Thank you for your attention!

Special thank you to our UW hosts
Very special thank you to Kim for your tireless work