Readout: Breakout C, McPherson

- MINOW:
  - TRISO fuel in SiC matrix
    - Proliferation safety, attack resistance. Difficult to extract the uranium.
    - To achieve a meaningful power density, this type of enrichment needed. But can be passively and inherently safe. TRISO- SiC can be safe to attack too.
    - Most vulnerable: transit.
  - Molten salt,
    - Addresses some materials questions– don't necessarily need new materials, but qualifications of materials. Expect challenges as far as interacting with radiation, temp, etc.
    - Sensors.
  - sCO2
    - Plus: could have smaller turbomachines
    - Challenges: heat exchanger (big -> tradeoffs), we have designs and some data, but not really a COTS technology. Much development needed.

Are there inherently (passively) safe designs?

- Several design options.
  - Passive safety in the core vs. the rest of the system… tradeoffs in system design
- More specificity in definition of passive vs. inherent safety needed. But consensus was that, particularly for these sizes, there are plenty of design options, particular if buried in the ground that can offer passive and inherent safety
- Proliferation and terrorist attack: different threat in different parts of the world (state vs. non-state).

What are the sensors/controls needed?

- Many—Need standard suite (temp, pressure, etc.), plus longer lifetime and higher temperatures.
  - Sensor calibration
  - Redundancy
  - Lifetime
  - Placement (inside core vs. opportunity to work outside the core– and infer properties/use physics-based modeling)
- Sensors will be critically important if we are going to have less human intervention/autonomy.
- Many sensors, particularly structural, would be broadly enabling (for small and large reactors).
- Cybersecurity must be considered.

Advanced Materials

- Do we need new materials? Or do we just need to qualify materials.
  - Need to qualify materials, but lots we do not know… new materials may be needed, but can't tell yet.
- Sensors will help, both for development, and for understanding operation.