Research Spotlight Forum

6.4.19 Quantum Information Sciences

2019 QUANTUM MISSION CAMPAIGN

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WHAT IS A MISSION CAMPAIGN?

Sandia Perspective

- A Mission Campaign is a focused, **5-7 year** internal R&D funding vehicle
  - **Essential: MC includes selected partnerships with external institutions**
  - Research
  - **Workforce** development
- **MC Intent:** Accelerate progress from the **idea stage to program benefit** in a technical area whose theme is relevant to Sandia's missions.

Quantum Mission Campaign

Partner Perspective

- A Mission Campaign is an opportunity to **continue or establish long-term collaborations** with Sandia
  - Access to expert personnel and unique resources dedicated to R&D (e.g., MESA)
  - Placement of students & graduates
- Work related to a Mission Campaign can take place **on site or at Sandia**
- Work related to a Mission Campaign likely to span:
  - **Fundamental scientific** investigations
  - Development of **enabling technologies**

Sandia's Quantum Mission Campaign is envisioned as complementary to a National Quantum Initiative hub

MISSION CAMPAIGN KEY EVENTS

May

June

July

August

October

Internal survey of ideas

QIS Spotlight

Finalize theme, partnerships, draft Q-MC

Prepare final Q-MC proposal; due August 2019

Decision Announce-ment

INITIAL THOUGHTS ABOUT A QUANTUM MISSION CAMPAIGN

- Work on "traditional" quantum systems. Improve current qubits and make them more robust to support near-term applications in sensing or QIP.
- **Likely emphasis**: More technology development, engineering; less basic research
- **Keywords**: NISQ, sensing, foundry, materials, advanced QCVV

Trapped ions	Photonics, Optomechanics, Heterogeneous Integration (HI)	Semiconductor qubits	Photonics, Optomechanics, HI	Rydberg atoms

- Develop technologies with combined quantum hardware platforms that enable coherent transfer of quantum information.
- **Likely emphasis**: more basic research, less engineering
- **Keywords**: hybrid quantum systems, quantum networks, secure communications

Thanks to D. Luhman

MISSION-CAMPAIGN RELATED OBJECTIVES FOR QIS SPOTLIGHT

- All: Sandia/Academic Alliance discussions re: a 5-7 year quantum related strategy
  - Identify compelling opportunities
- Academic Alliance representatives: share your own quantum related interests and forecasts
- All: Initial ideas for pairing of Academic Alliance investigators with Sandia SMEs
- All: Quantum "incubator" ideas; focus on exploration of novel ideas that pose high(er) technical risks
- All: Best practices for collaboration and interaction among all Q-MC participants

We are still finalizing the Quantum Mission Campaign theme: *Your ideas can influence the final outcome*