

# CF6: Quantum Computing Summary

August 2020

# Productive parallel sessions

- We had a good set of reports covering a broad set of topics in quantum computing relevant to HEP.
  - Coverage of all possible relevant topics was about 75% (?)
- We identified additional people interested in quantum computing and technology for Snowmass and have good ideas about who we need to further encourage for LOIs and for Whitepapers.
- We produced enough raw material to begin organizing a “synthesis Whitepaper” in quantum computing (and technology).

# Overlaps

- Strong overlaps with the Theory Frontier and Instrumentation (quantum sensing)
  - May be worth pursuing joint workshops.
  - We are already in conversation with the Theory Frontier about joint and cross-listed whitepapers - need to begin this conversation with the Instrumentation Frontier.
- Within the Computing Frontier, potentially interesting overlaps with
  - CF2 - theory and simulations (how can quantum computing improve “traditional” HEP simulation, how can we cover the “gap” between detector simulation and pure QFT simulation, etc.?), SciDAC-esque collaborative teams?
  - CF4 - interesting facilities questions: how to spend the marginal “access” dollar in HEP? Do we prefer commercial cloud access to quantum resources? Should we buy in bulk and offer access through something like INCITE? Should we co-design and build HEP-centric hardware? (Or rather - given that we WILL build hardware, how do we invest in it for “production”? Do we?) Should we “commission” hardware from industry?

# Next steps

- Organize material from the workshop, press speakers for useful references.
- Follow the production of LOIs.
- Begin to prompt writing teams for whitepapers.
- Begin discussions with groups with potential overlap about joint projects, whitepapers, meetings, etc.
- Extend informal discussions with scientists in BES, ASCR, NP, QIS to further explore connections