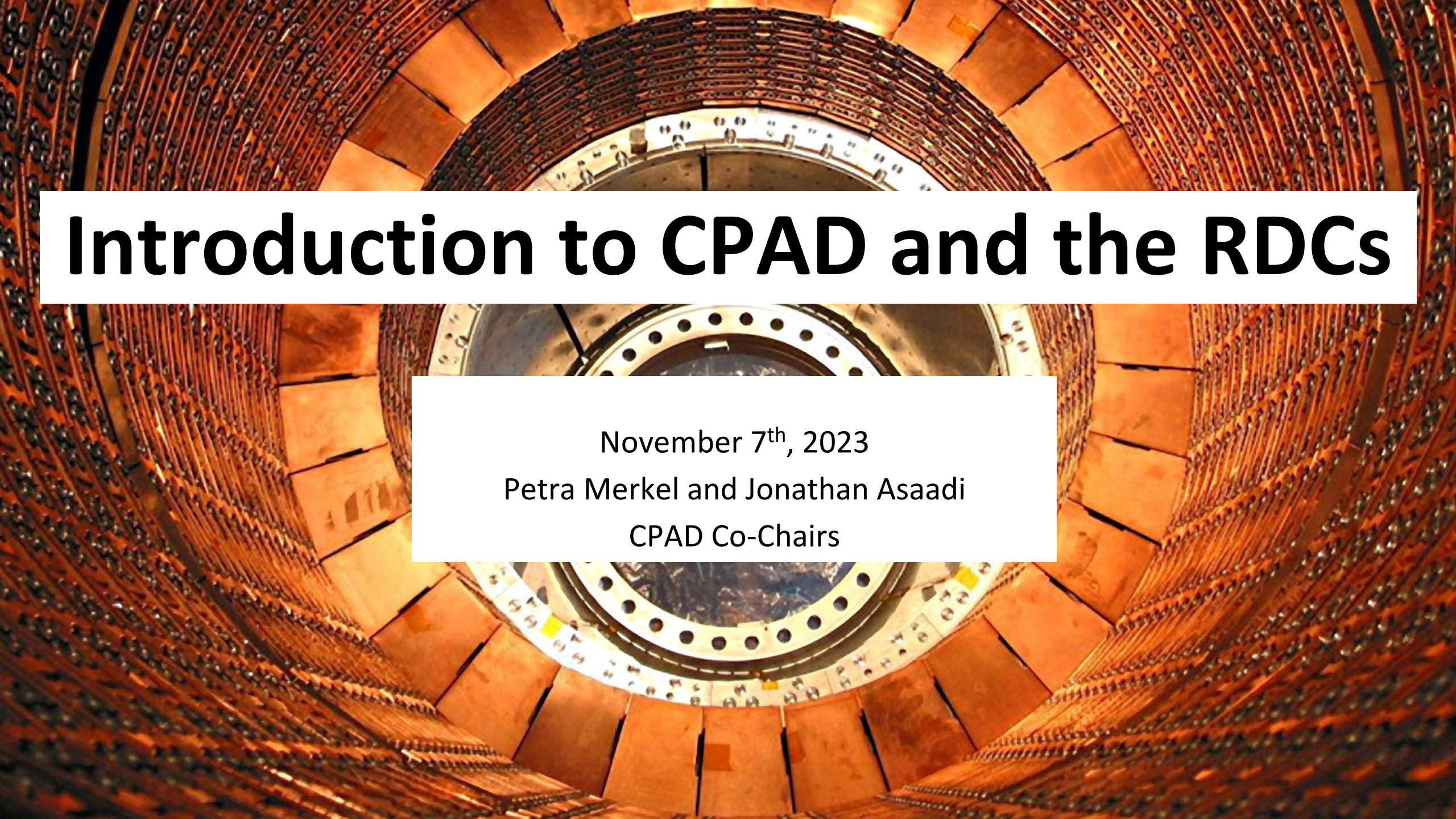

Introduction to CPAD and the RDCs

November 7th, 2023

Petra Merkel and Jonathan Asaadi

CPAD Co-Chairs

Welcome!

- Welcome to the 2023 CPAD workshop at SLAC
- 273 registrants, record number in person attendance!
- 8th annual workshop bringing together the Detector R&D community in the US

What is CPAD?

- **C**oordinating **P**anel for **A**dvanced **D**etectors
  - a panel of the APS/DPF
  - https://cpad-dpf.org/
- CPAD seeks to promote, coordinate and assist in the research and development of instrumentation and detectors for high energy physics experiments
- Originated from 2012 Snowmass process (Instrumentation Frontier)
- Over last few years developed bylaws that regulate CPAD leadership: 2-year rotating terms for Chairs and Executive Committee members, nominations from the community

Current CPAD Leadership

Petra Merkel
FNAL
Chair

Jonathan Asaadi
Texas, Arlington
Vice-Chair

Marina Artuso
Syracuse

David Asner
BNL

Carmen Carmona
Penn State

Noah Kurinsky
SLAC

Kim Palladino
Oxford

Sally Seidel
New Mexico

Michelle Stancari
FNAL

Aritoki Suzuki
LBNL

Steve Worm
Humboldt/DESY

Jinlong Zhang
ANL

What does CPAD do?

- Annual CPAD workshop
- Occasional topical workshops (e.g. QIS kick-off in 2017)
- Graduate Students in Instrumentation Research Awards (GIRA)
- DPF Instrumentation Awards
- Assist DOE program manager with SBIR program
- **NEW: RDCs = R&D Collaborations**

What are the RDCs?

- Newly formed groups under the stewardship of CPAD
- Born out of Snowmass recommendation
- Create a **network** of US Detector R&D Collaborations
  - coordination between different RDCs and exchange with ECFA DRDs
- These Collaborations will be created covering major technology areas in line with the 2019 BRN. The goal is to bring together the community in a more persistent way than the annual CPAD workshops alone, to coordinate R&D efforts and to forge collaborations

R&D Collaborations

RDC#	TOPIC	COORDINATORS	MAILING LIST
1	Noble Element Detectors	Jonathan Asaadi, Carmen Carmona	cpad_rdc1@fnal.gov
2	Photodetectors	Shiva Abbaszadeh, Flavio Cavanna	cpad_rdc2@fnal.gov
3	Solid State Tracking	Anthony Affolder, Sally Seidel	cpad_rdc3@fnal.gov
4	Readout and ASICs	Angelo Dragone, Mitch Newcomer	cpad_rdc4@fnal.gov
5	Trigger and DAQ	Zeynep Demiragli, Jinlong Zhang	cpad_rdc5@fnal.gov
6	Gaseous Detectors	Prakhar Garg, Sven Vahsen	cpad_rdc6@fnal.gov
7	Low-Background Detectors	Daniel Baxter, Guillermo Fernandez-Moroni, Noah Kurinsky	cpad_rdc7@fnal.gov
8	Quantum and Superconducting Sensors	Rakshya Khatiwada, Aritoki Suzuki	cpad_rdc8@fnal.gov
9	Calorimetry	Marina Artuso, Minfang Yeh	cpad_rdc9@fnal.gov
10	Detector Mechanics	Eric Anderssen, Andreas Jung	cpad_rdc10@fnal.gov
11	Fast Timing	Gabriele Giacomini, Matt Wetstein	cpad_rdc11@fnal.gov

Many thanks to these people for taking on the tasks to form these groups, identify R&D topics, goals and roadmaps!

Principal Ideas behind the RDCs

Detector R&D in many different technology areas is essential to realize many of the future planned experimental efforts spanning all of the frontiers in High Energy / Nuclear Physics

Much of the efforts needed require **collaboration** and **coordination** in order to realize the technologies required

- **Collaboration**: The required expertise/resources/new ideas often live within multiple people, institutions, labs and only by bringing these pieces together can we hope to realize the technological challenges
- **Coordination**: We live in a resource limited funding environment and so we need efforts to be coherent, minimize duplication, and to build off of progress happening elsewhere (both in other technologies and in other places)

Principal Ideas behind the RDCs

Collaboration

Where the RDC's can work to identify needed R&D, put together work-packages, and aid in the execution of the work

Detector R&D in many differen any of the future planned experime High Energy / Nuclear Physics

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Principal Ideas behind the RDCs

Detector R&D in many differen any of the future planned experime High Energy / Nuclear Physics

Coordination

This is what CPAD is meant to help provide and why these collaborations are being formed within our structure/charge

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What will the RDC's do?

Long term goal:

- Provide a collaboration which can link together facilities, expertise, people, and experience to tackle technology challenges across HEP/NP
- Facilitate new funding mechanisms for R&D related to a specific technology area which will take place as part of the collaborations' activities
- Work with the CPAD executive committee, ECFA DRDs, and the broader R&D community to foster a collaborative, supportive, and coordinated environment for new ideas, blue sky efforts, and non-project specific R&D

What will the RDC's NOT do?

The RDC's will NOT:

- **Discourage single/small team efforts in R&D**
  - We still need for individual PI's to be able to work in their labs on their favorite ideas and leave room for innovation and unexpected solutions
- **Break up existing collaborations / structures**
  - We already have communities within HEP/NP which coordinate on specific technological challenges (e.g. HEP-IC) and we want to utilize/leverage these efforts and communities to help make the CPAD-RDC's successful
- **Discourage project specific R&D**
  - There is some R&D which will/has reach(ed) a level of maturity that it is time to realize it for a specific implementation and the RDCs should encourage this transition from generic to specific R&D

What is the envisioned structure

- **Each RDC has 2-3 coordinators who work with CPAD executive committee and the community to define the R&D goals**
  - These need to align with the BRN and Snowmass efforts
  - These should be sufficiently generic to allow for new or unforeseen ideas
- **The RDC coordinators will work with the community to put together "work packages" which bring together a collaboration to tackle some idea / technology**
  - These can be university- or lab-led
  - Should have associated timelines and milestones
- **These work packages can then be turned into proposals for funding**
  - In the short-term future, these may be responses to the comparative review funding announcements or reallocation of lab-based (KA25) funds
  - In the long term, this hopefully becomes a new funding mechanism with dedicated FOA and a new funding stream

At this workshop

- The parallel sessions at this workshop are dedicated to the RDCs
- We are just getting started, not everything will fit perfectly, we will learn and adapt
- Annual CPAD workshop should become just one of several touch stones throughout the year: coordinators will organize working group meetings, workshops, cross-cutting meetings, etc.
- The community is encouraged to give input into shaping these groups into their most useful form!