What is DRD8 ?
CERN detector R&D collaboration on Mechanics & Cooling of Future Vertex and Tracking Systems

Steering Committee for DRD8

(G Viehhauser, P Petagna, A Jung, B Schmitt for the DRD8 collaboration)

Slides credit from Georg

Introduction

- DRD8 community is significantly smaller than other DRD collaborations: currently 38 participating institutes

- DRD8 has grown out of annual Forum on Tracking Detector Mechanics
  - Existing community with well-functioning regular networking
- Collaborating institutes are already involved in activities fitting within the DRD8 portfolio on funded projects that are linked to specific experiments (ALICE, LHCb, Mu3e, ePIC etc.)
  - No need for additional management structure for that

→ DRD8 strategy: Focus on a limited number of core projects that promise a significant leap of capability and would otherwise not be pursued

Work packages

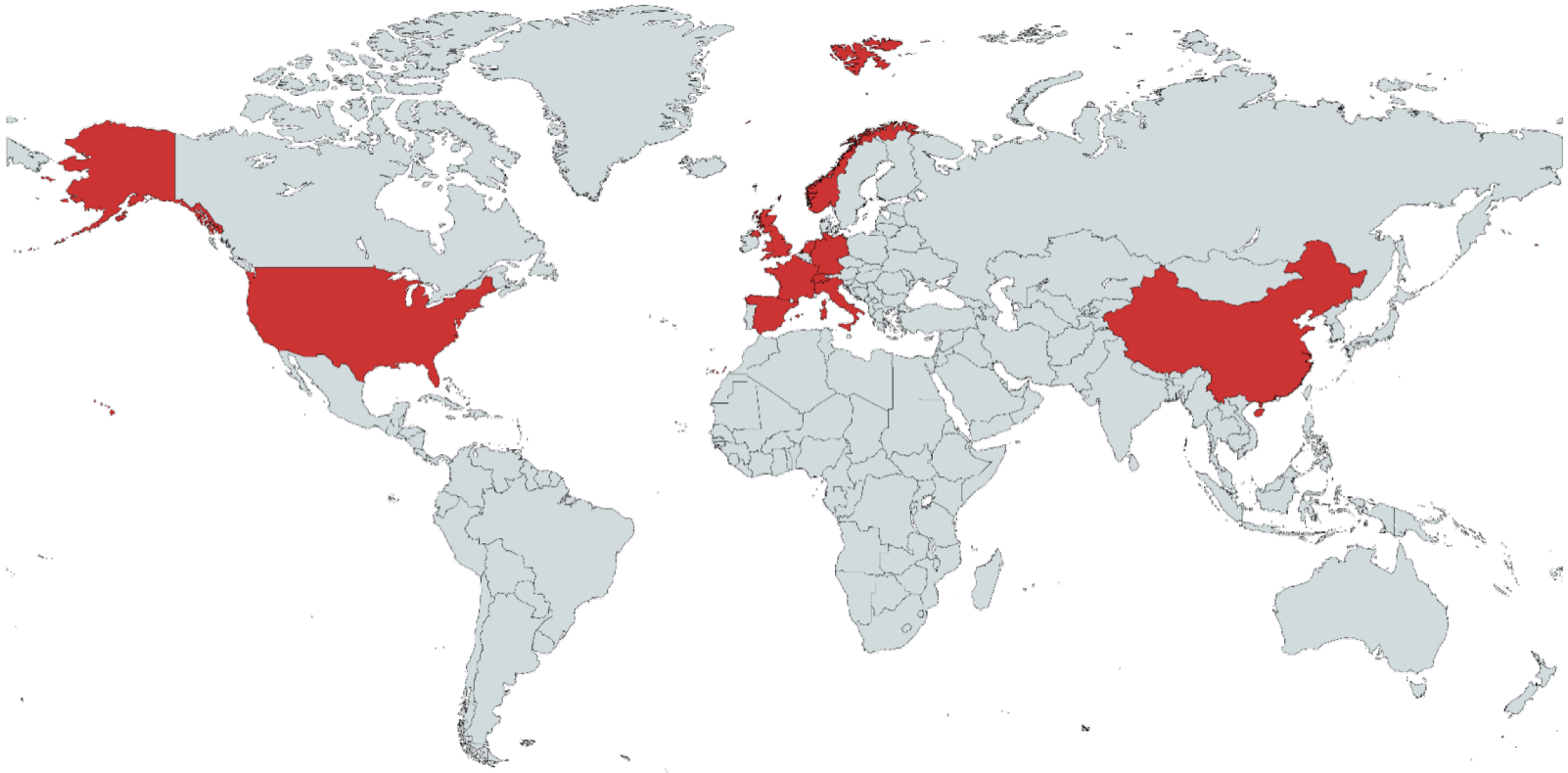
- DRD8 will be divided into four work packages
  - WP1: Global system design and integration
  - WP2: Low-mass mechanics and thermal management
  - WP3: Detector cooling
  - WP4: Design and qualification tools
- Each WP will cover three aspects
  1. Each WP comprises two research projects
     - Two for now, can be increased in the future
  2. As most of the groups in the collaboration are already in funded projects: Improve opportunities for networking, information exchange and access to equipment and/or facilities
  3. Research activities undertaken by member groups that will not be managed by the DRD8 organisation, but address research goals within the DRD8 portfolio
     - These are typically small collaborations or single institutes
     - For endorsement by the DRD8 Steering Committee, to strengthen their case when applying for funding
     - DRD8 will organize reviews if requested

Projects

- Projects have been chosen by WP coordinators based on suggestions from the community
  - Project 1.1: The Vertex Region of Future Particle Physics Experiments
  - Project 1.2: Robots in the HEP Experimental Caverns
  - Project 2.1: Advanced Mechanical Tracker Structures
  - Project 2.2: Characterisation of Material Properties and Database Development
  - Project 3.1: New Evaporative Cooling Fluids and Systems
  - Project 3.2: Microchannel Cooling Substrates
  - Project 4.1: Extended Reality (XR) Development
  - Project 4.2: Connection of Engineering Design Tools with Physics Simulation Software
- Interesting range of topics from tools with very clear focus to blue skies creative thinking with a wide open field of possible solutions
- Currently between 3 and 16 participating institutes per project
  - Depending on breadth of anticipated activities

Participating institutes

Country/Organisation	Institute
CERN	CERN
China	IHEP
France	CPPM Marseille IJCLab Orsay LPNHE Paris IPHC Strasbourg
Germany	DESY Freiburg University GSI Darmstadt Halbleiterlabor of the Max-Planck-Society Fachhochschule Offenburg
Italy	FBK Trento INFN Ferrara INFN LNF Frascati INFN Genova INFN Perugia INFN and University of Pisa University of Rome La Sapienza
Netherlands	Nikhef
Norway	NTNU Trondheim
Spain	CNM Barcelona IFIC Valencia
Switzerland	University of Geneva
United Kingdom	UKRI-STFC Rutherford Appleton Laboratory University of Bristol Bristol Composites Institute National Composite Centre (NCC) University of Liverpool University of Manchester University of Oxford University of Sheffield
USA	Cornell University University of Arizona Fermilab Florida Institute of Technology LBNL Purdue University SLAC



- Open to additional collaborators (some already under negotiation)
- Encouraging industrial partners (one industrial partner already part of proposal)

Miscellaneous

- Meetings
  - DRD8 collaboration meetings twice a year
    - Once in conjunction with the Forum on Tracking Detector Mechanics (abroad)
    - The other likely to be at CERN
  - WP meetings will be organised by WP conveners regularly as useful for advancing the research programme
- Education and training
  - DRD8 too small and its research topics too narrow to justify stand-alone schools or similar
  - Will identify lecturers for lecture courses on relevant topics, and facilitate exchange of educational material among these lecturers
  - Lecturers are ready to participate in schools within the DRD collaborations and outside (e.g. CERN summer school, ECFA summer school, EDIT)

Next steps

- Attract additional collaborators, also from industry
- Write and agree on MoU, which will detail the role of participating institutes and companies
- Most important: Acquire funding

- Collaboration meeting in May/June 2025 in conjunction with Forum on Tracking Detector Mechanics 2025 in Bristol
  - 2d DRD8, 3d Forum