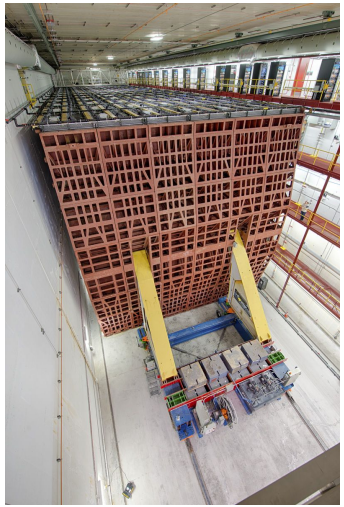
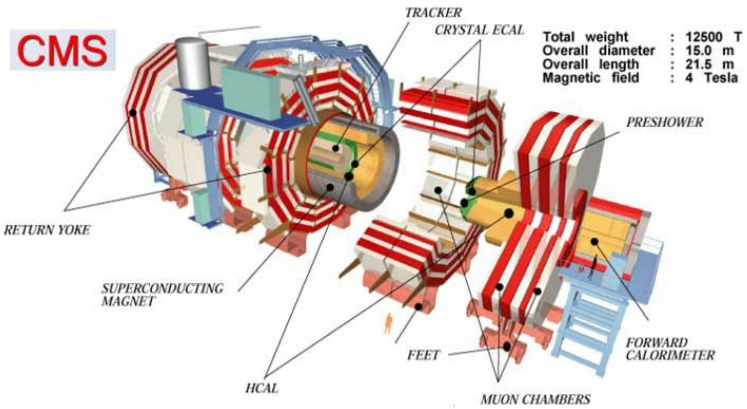
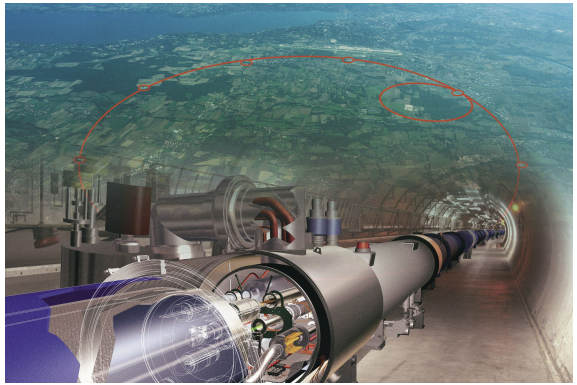
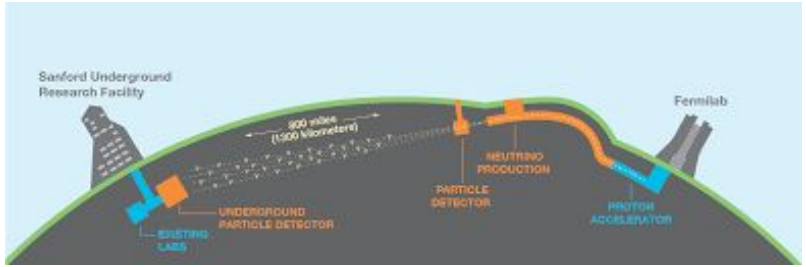
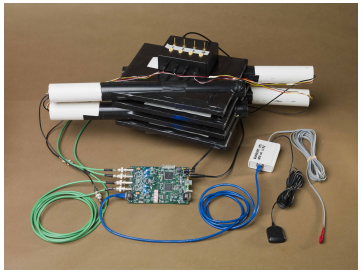
What is QUARKNET ?











Program Overview

How does QuarkNet work?

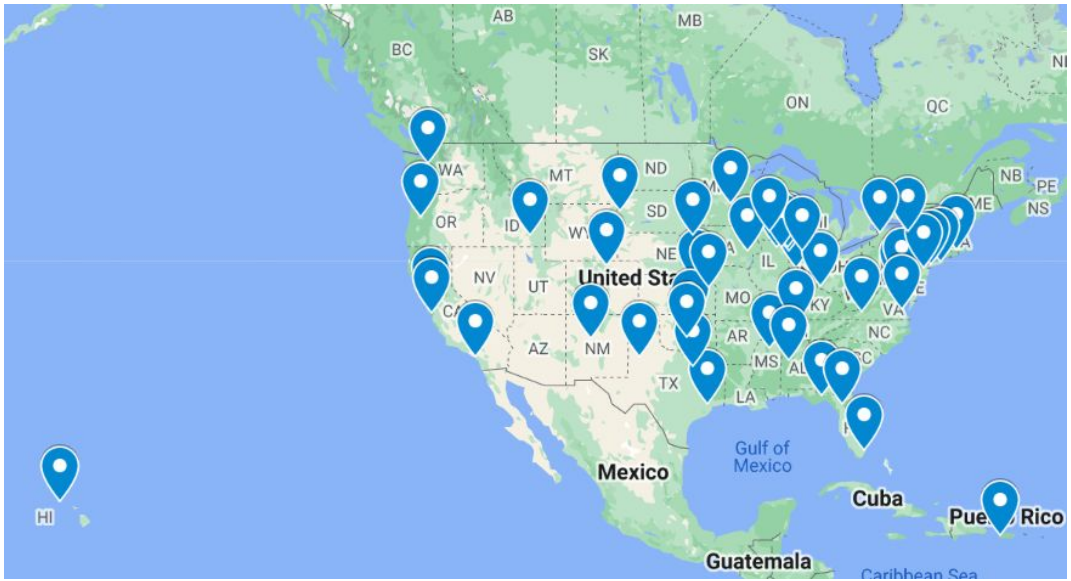
Outline:

- **Long-term national PD program *based at centers***
- **50 centers across the US (from PR to HI)**
- **Serving:**
  - **teachers (camps, fellows, CERN programs, networking)**
  - **and their students (IMC, cosmics, DAP)**
- **Creating particle physics content and methods with teachers**

Program Overview

A national program at the local level

- ~5 PI's and national staff
- ~50 QuarkNet centers across the U.S.
- ~500 teachers



Cecire & Pasero, Ad Board Meeting, Dec. 2023

Program Overview

QuarkNet happens at the centers …

Program Overview

… and at the national level.

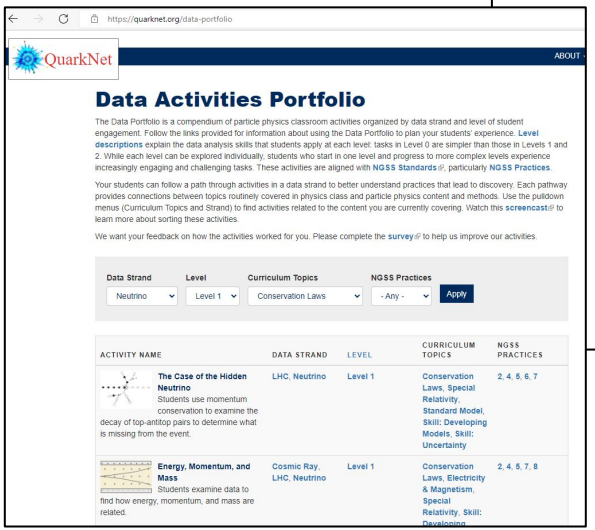
- Teachers
  - Coding and Data Camps
  - Fellows: Coding, T&L, LHC, Neutrino
  - CERN Summer Programs
- Students and Teachers
  - International Masterclasses in Particle Physics
  - Cosmic Ray Studies
  - Data Activities Portfolio
- quarknet.org

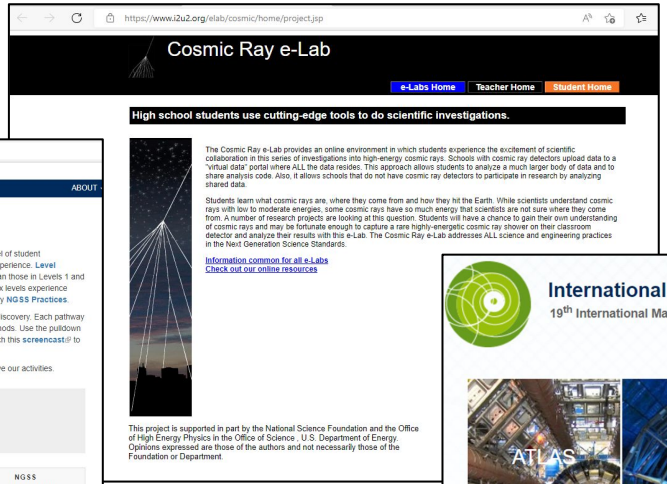
Program Overview

National Opportunities

Program Overview

Resources





Program Overview

Cosmic Rays / e-Lab Analysis

Hardware: Maintain hundreds of teachers' CRMDs

e-Lab Analysis:

- **In-school and multi-school Projects**
- **Pyramid muon tomography**

e-Lab Software: analysis code and event displays

New efforts: Cosmic Watches, radio horns, pixel tracker

Program Overview

Data Activities: Snapshot in Time

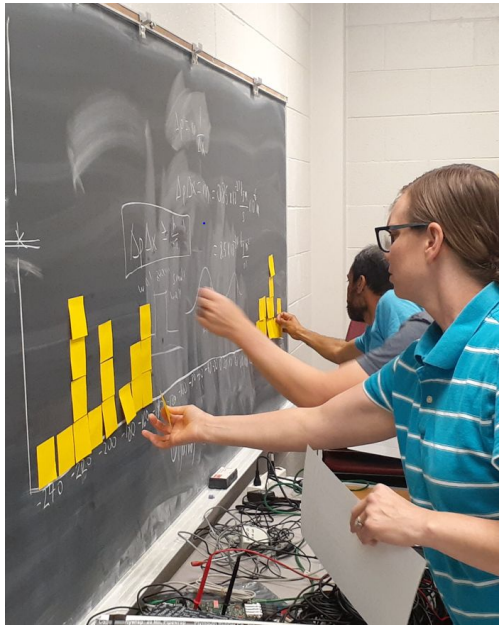
In the Beginning (2017)	End of Grant (2022)	Now (2023)
14 Activities	38 Activities	39 Activities
Variety of structures	Specific Structure	Specific Structure
No Protocol	Protocol Aligned with PD Criteria	Protocol Aligned with PD Criteria
Level 1-3	Level 0 - 4	Level 0-4
No Teacher Answer Key	Teacher Answer Key in Teacher Notes	Teacher Answer Key in Teacher Notes
Assessment	Assessment with Answers	Assessment with Answers
No Coding Activities	Two Coding Activities	Three Coding Activities
No Spanish Language Versions	Five Spanish Language Activities	Nine Spanish Language Activities

Roudebush, Ad Board Meeting, Dec. 2023

Program Overview

QuarkNet is about …

- Particle physics
  - Physics we teach
  - Methods and skills
  - Ideas and opportunities
- Teamwork and network
- Teacher Professional Development



Cecire & Pasero, Ad Board Meeting, Dec. 2023