

# Physics Masterclasses in Africa and the World

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TECHNISCHE  
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NOTRE DAME



International Particle  
Physics Outreach Group



INTERNATIONAL

MASTERCLASSES

hands on particle physics



QuarkNet



NETZWERK  
TEILCHENWELT



# International Masterclasses Concept

- High school students (15 – 19) are “scientists for a day”
- Invited to a research institute or university
- Introductory talks (standard model, detectors, accelerators)
- measurement with authentic data from
  - Large Hadron Collider at CERN
  - Belle II at KEK
  - Neutrino Experiments at Fermilab
  - Particle Therapy
- International video conference ( 3 – 5 inst. + moderators)





# Sample Agenda

<b>Local time</b>	<b>Activity</b>
(prep)	(classroom activities)
8:30 - 9:00	registration & welcome
9:00 - 10:00	introduction to Particle Physics
10:30 - 11:30	second talk or tour
12:00 - 13:00	lunch (with physicists)
13:00 - 15:00	data analysis
15:00 - 16:00	local combination + discussion
16:00 - 17:00	international video conference







# Videoconference

- 45-60 min
- 3-5 institutes, reflecting international collaboration
- Same measurement, different data
- 2-3 Moderators (PhD students, Postdocs)
- Moderation centers: CERN, Fermilab, KEK, GSI, TRIUMF
- Agenda of the videoconference
  - Welcome
  - Combination and discussion of results
  - General Q & A
  - Quiz (CERN)





# Why and What

## Why International Masterclasses

- Start development of next generation of scientists and engineers
- Promote interest in science among all students
- Students work side-by-side with
  - Physicists in their home region
  - International collaborators
- Visit to university or laboratory

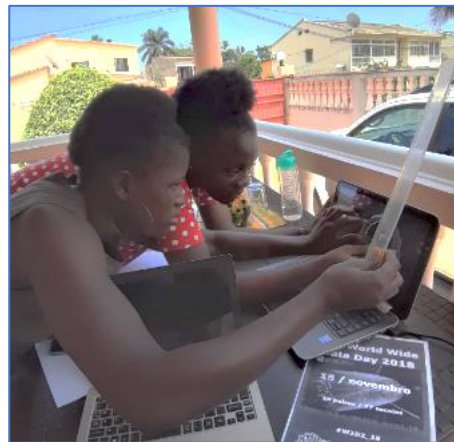
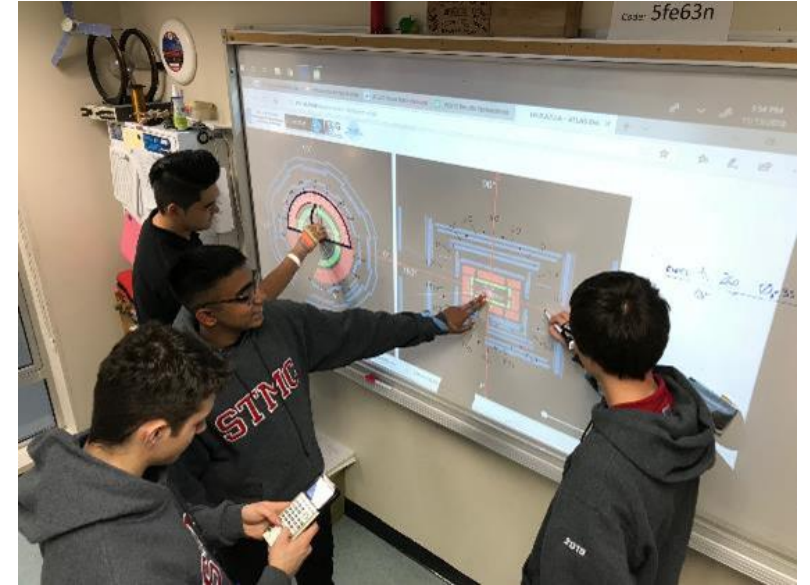
## What it takes

- Space to work with students
- Computers
- High speed internet (unless local masterclass only)
- Scientist leadership:
  - Organizer
  - 1 tutor:10 students
  - Coordinate with IMC
  - Flexibility
  - Welcoming attitude



# Opportunities

- Flavors of masterclass:
  - IMC “regular season”
    - Feb-Apr each year
    - Full masterclasses as described
  - World Wide Data Day
    - One day in Nov or Dec
    - Simplified measurement
  - International Day of Women and Girls in Science
    - Special masterclasses
    - Feb
  - “Off-shell”
    - Anytime, anywhere
  - Alternative designs
    - Schedule
    - Measurements







# Invitation

- Website
  - <https://www.physicsmasterclasses.org>
- Contact co-Coordinator
  - Uta, [Uta.Bilow@tu-dresden.de](mailto:Uta.Bilow@tu-dresden.de)
  - Ken, [kcecire@nd.edu](mailto:kcecire@nd.edu)
- Think about:
  - Organizing
  - Tutoring
  - Moderating
  - Creating

