Photon Spectrometer - PHOS

Øystein Djuvsland

Department of Physics and Technology - University of Bergen

November 9, 2012

The PHOS Detector

The PHOS Detector

- Photon Spectrometer: measure the energy spectra of photons in heavy ion collisions (of course also in proton collisions)

The PHOS Detector

- Photon Spectrometer: measure the energy spectra of photons in heavy ion collisions (of course also in proton collisions)
  - *Doesn't sound very exciting? Well, it is a very simplified view...*

The PHOS Detector

- Photon Spectrometer: measure the energy spectra of photons in heavy ion collisions (of course also in proton collisions)
  - *Doesn't sound very exciting? Well, it is a very simplified view...*
  - *There is a lot of physics to be extracted from measuring photon energy*

The PHOS Detector

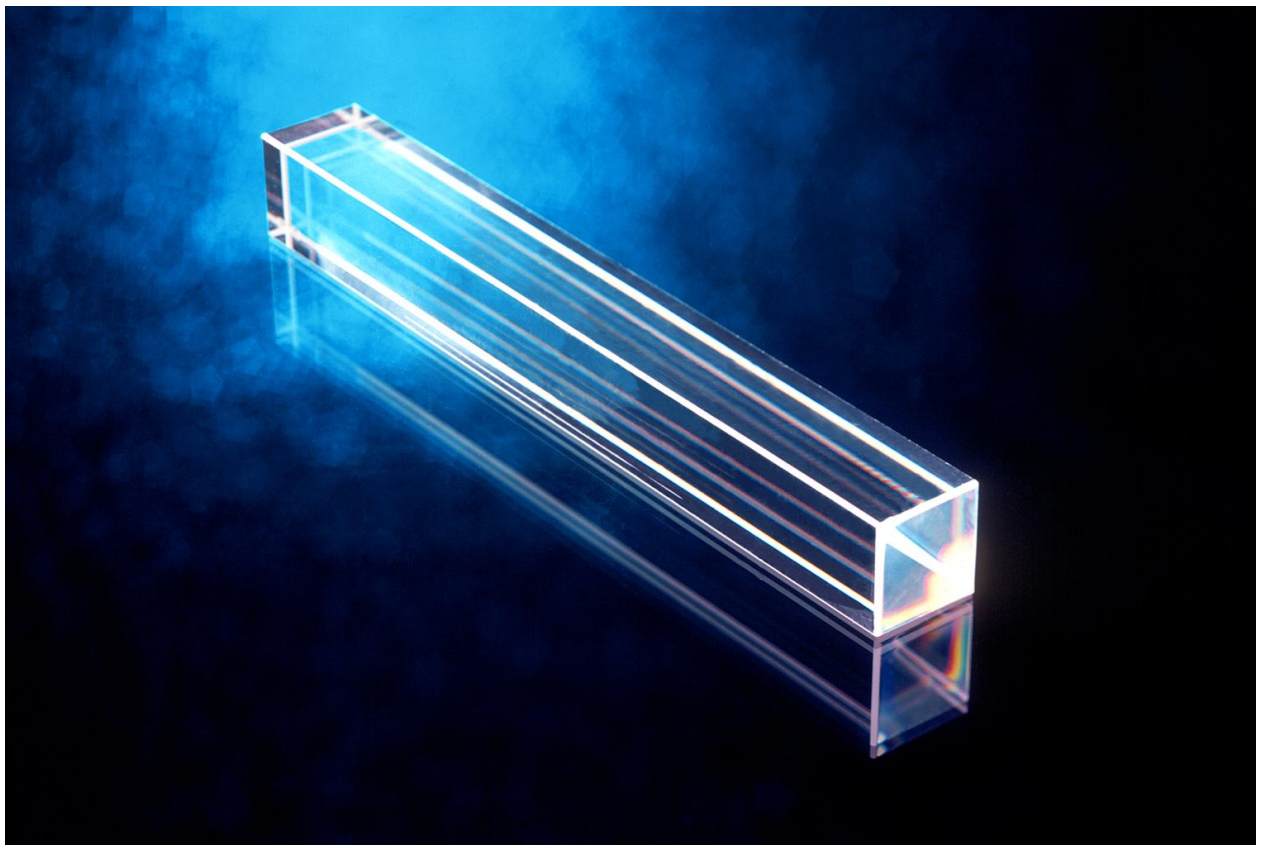
- Photon Spectrometer: measure the energy spectra of photons in heavy ion collisions (of course also in proton collisions)
  - *Doesn't sound very exciting? Well, it is a very simplified view...*
  - *There is a lot of physics to be extracted from measuring photon energy*
  - *For instance, we can measure the temperature of a system of a size* $\sim 10^{-15}$ *m, living for* $\sim 10^{-15}$ *s! (Black body radiation)*

The PHOS Detector

- Photon Spectrometer: measure the energy spectra of photons in heavy ion collisions (of course also in proton collisions)
  - *Doesn't sound very exciting? Well, it is a very simplified view...*
  - *There is a lot of physics to be extracted from measuring photon energy*
  - *For instance, we can measure the temperature of a system of a size* $\sim 10^{-15}$ *m, living for* $\sim 10^{-15}$ *s! (Black body radiation)*
- The PHOS project is collaboration between Norway (UiB, UiO), Czech Republic, China, Japan, Poland and Russia

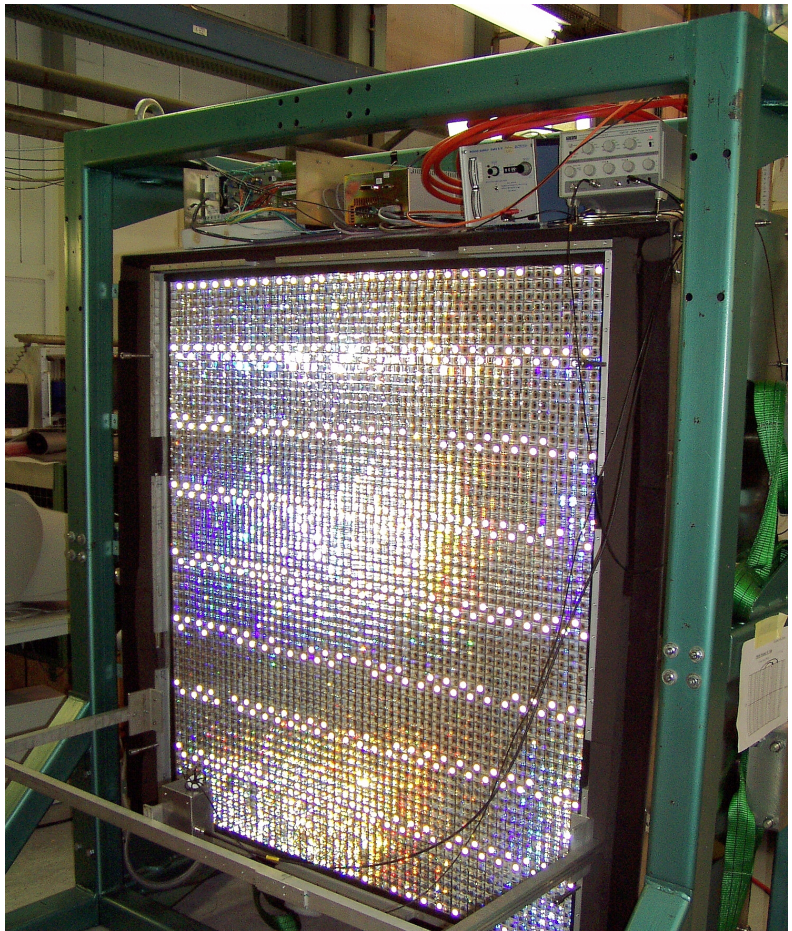
Some facts and pretty pictures

- 3 modules with 3584 channels x-tals (7168 channels)
  - *PW0 crystals - Basically lead and tungsten, heavy*
- Each crystal costs a few hundred dollars - Not cheap
- Cooled down to -25 degrees celcius

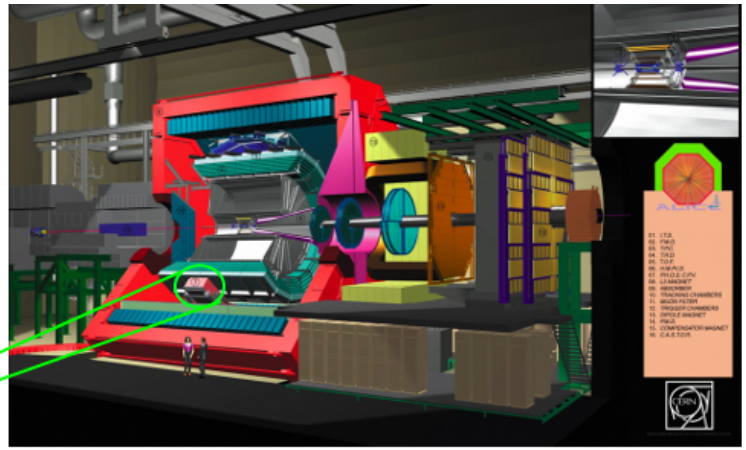


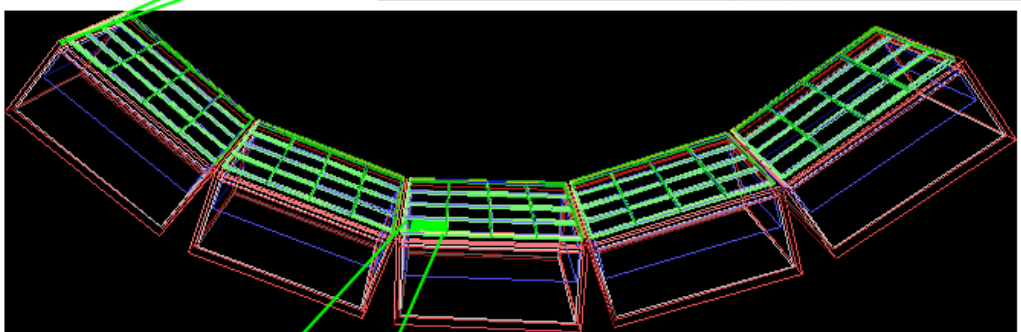
Some facts and pretty pictures

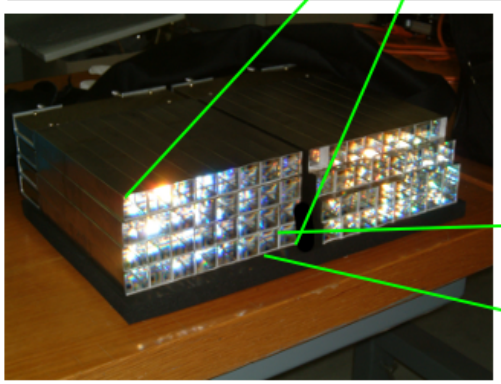
- 3 modules with 3584 channels x-tals (7168 channels)
  - *PW0 crystals - Basically lead and tungsten, heavy*
- Each crystal costs a few hundred dollars - Not cheap
- Cooled down to -25 degrees celcius

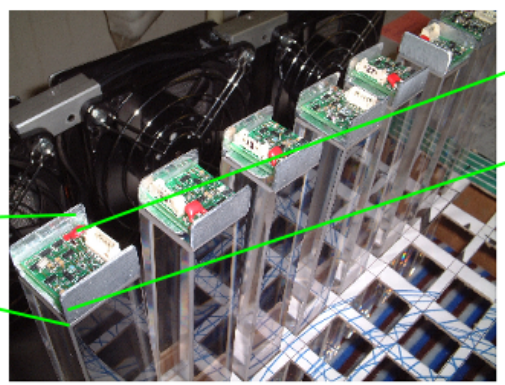


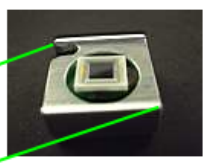
PHOS Breakdown



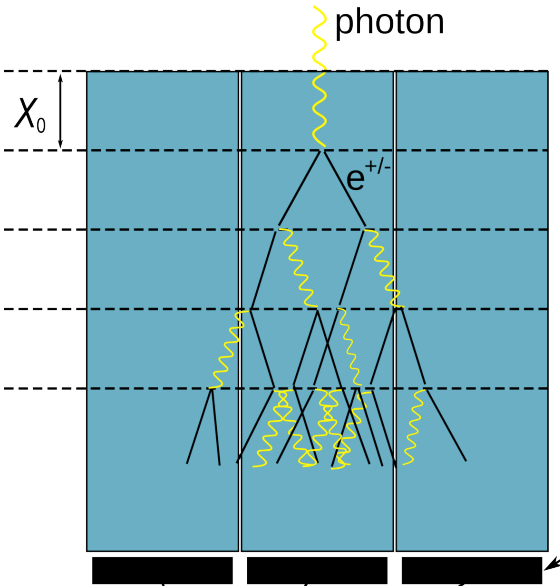




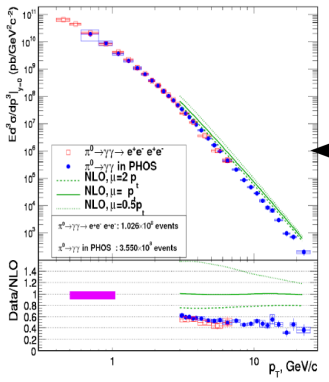




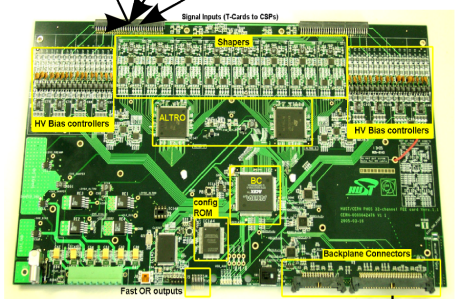
Doing Physics

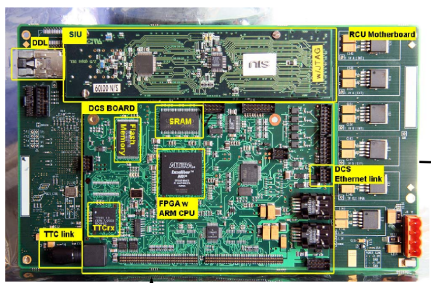


Avalanche Photo Diode
+ Amplifier



Grid





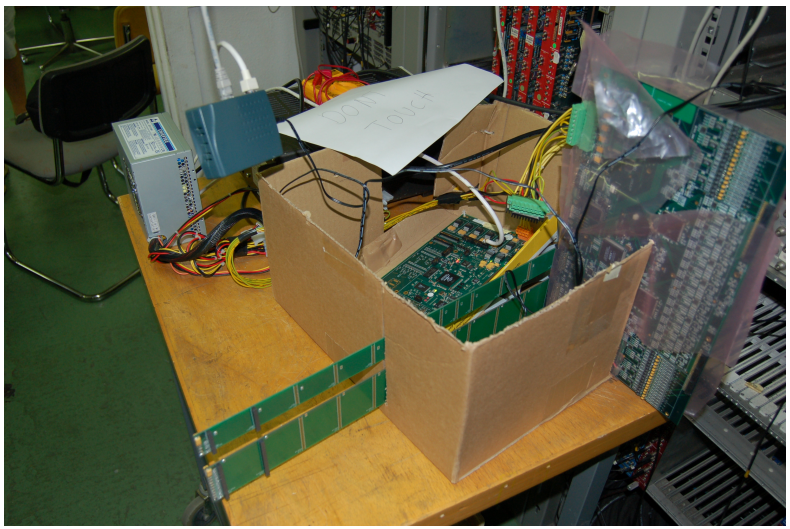
Data Aquisition
(DAQ)

Front End Card

Readout Control Unit

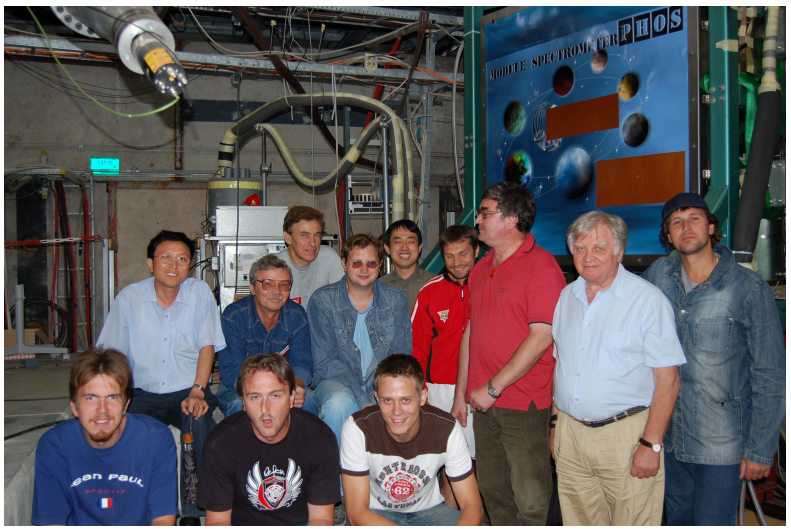
How did it end up in that hole?

- 1999 - PHOS Technical Design Report
- 2006 - First module ready for beam test
  - *Enter me*
- 2007 - Cosmic tests
- 2008 - First module installed
- 2009 - Three modules installed
- 2012 - Still taking data
  - *I'm still kind of around*



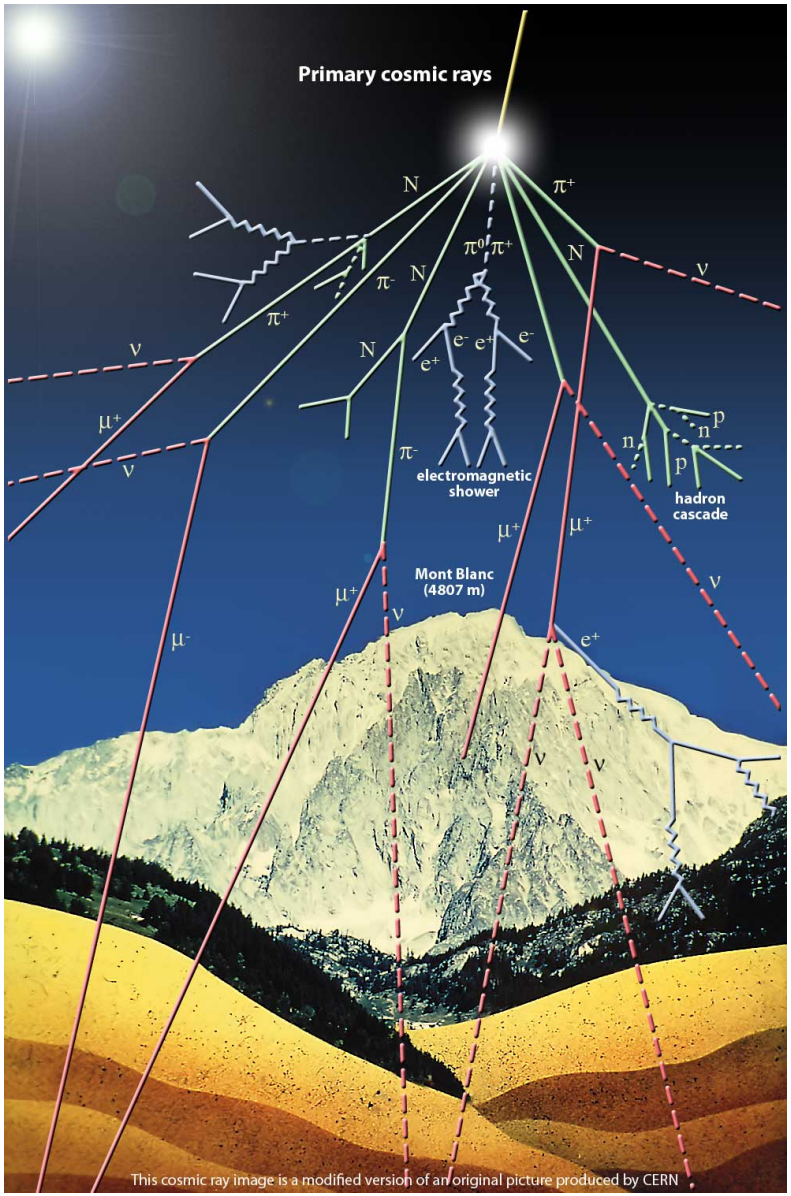
How did it end up in that hole?

- 1999 - PHOS Technical Design Report
- 2006 - First module ready for beam test
  - *Enter me*
- 2007 - Cosmic tests
- 2008 - First module installed
- 2009 - Three modules installed
- 2012 - Still taking data
  - *I'm still kind of around*



How did it end up in that hole?

- 1999 - PHOS Technical Design Report
- 2006 - First module ready for beam test
  - *Enter me*
- 2007 - Cosmic tests
- 2008 - First module installed
- 2009 - Three modules installed
- 2012 - Still taking data
  - *I'm still kind of around*



How did it end up in that hole?

- 1999 - PHOS Technical Design Report
- 2006 - First module ready for beam test
  - *Enter me*
- 2007 - Cosmic tests
- 2008 - First module installed
- 2009 - Three modules installed
- 2012 - Still taking data
  - *I'm still kind of around*