International Particle Physics Outreach Group

- Autumn Meeting 2016

IPPOG Membership Benefits
"An inside view from Pt"

or "How we got a Spark Chamber to the Library of Alexandria... and a few other places"

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CERN, Geneva, 10/11/2016

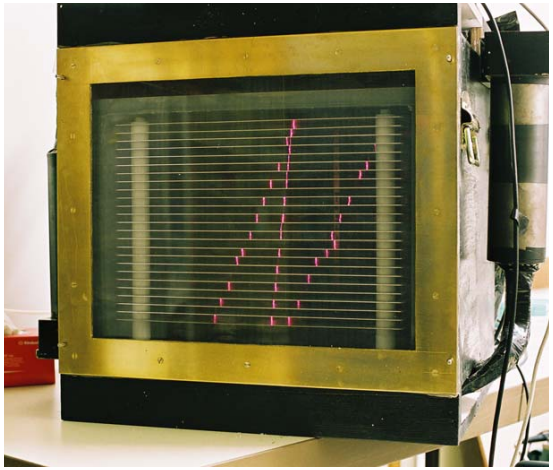
30 anos LIP

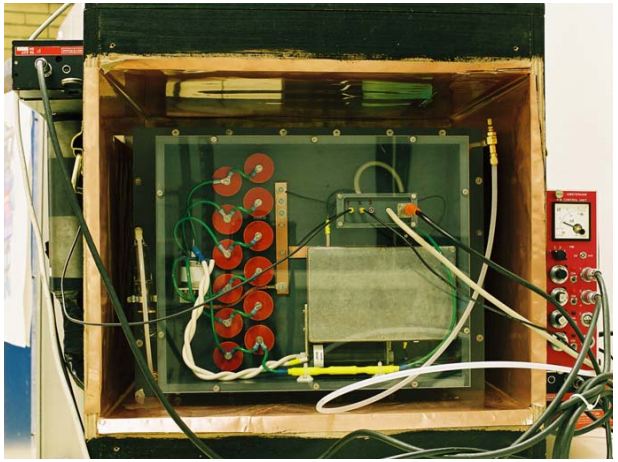
Preamble (activities highlights since last meeting)

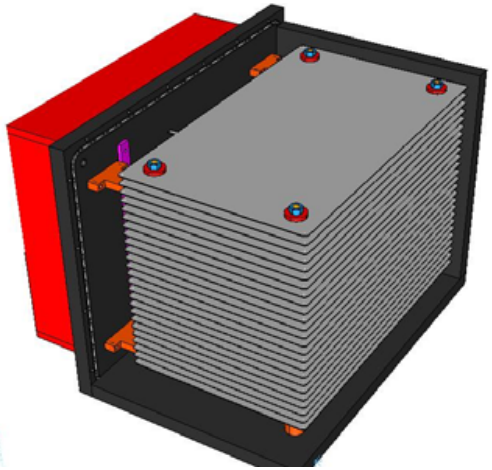
- Summer in the Science internships
  - 2 weeks internships for high-school students (20 students in 4 proposals)
- 10th CERN Portuguese Language Teachers Programme (Thanks CERN!)
- 2015 Nobel Prize Public Session (w/ Arthur McDonald & ν Oscillations)
  - @The Pavillion of Knowledge/Ciência Viva Agency, Sept.6th, 2016 (+230 participants)
- Fisica2016 – Nat'l Phys. Conf.+Iberian Phys.Educ.Meeting– Sept.8th –10th
  - In Braga, with a strong emphasis on neutrinos and the presence of Arthur McDonald
- "Partículas" Exhibition closed at the end of May and reopened at the Lisboa Planetarium – Ciência Viva Centre
  - (re-)inaugurated on the European Researcher's Night to last until April 2nd, 2017
  - 6 "Meetings with the Scientist" – public sessions addressing the science behind the 6 modules of the exhibition – free entrance, auditorium capacity: 320 seats.
  - Other seminars/sessions at this setting for all age groups

CERN, EPOG Autumn Meet. 2004

- Henk Tiecke presented HiSparc and the Portable Spark Chamber





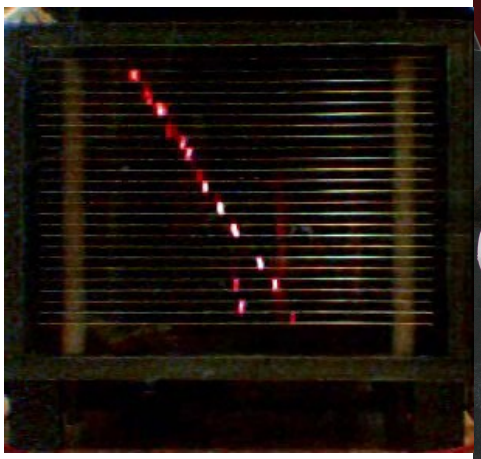


- Agrees to provide all construction drawings and details – available at

  http://**www.nikhef.nl/~h42/sparkchamber/**

LIP, Coimbra, 2005-2006

- LIP Workshop in Coimbra prepares to build our first Spark Chamber
  - Financed by an outreach project approved for the WYP'2005
  - Commissioned for the public session of the XXth ECRS – European Cosmic Rays Symposium that happened in Lisboa in September 2006
  - About 1 year of tests/rebuilds/more tests/redesigns/etc, part of a Master Thesis by Paulo Martins supervised by João Carvalho.
  - Done with the original gas mixture of 70%Neon+30%Helium



- A great success in the public session of the conference, offering personal Cosmic Rays (certificates)
- Reported 10 yrs. ago in the EPPOG Autumn meeting (Oct.2006)

Custom made Cosmic Rays Certificate

YOUR LOGO

Pavilion of Knowledge

EXHIBITION NAME AND LOGO

PAVILHÃO DO CONHECIMENTO CIÊNCIA VIVA

SPONSOR, etc

Place, Country, 38º 46' 19.71" N
(coordinates) 9º 05' 38.45" W

YOUR INSTITUTION's NAME

THIS COSMIC RAY PASSED THROUGH ME!

Spark Chamber and Cosmic Rays

Cosmic Rays are particles traveling through space, and those reaching the top of the Earth's atmosphere are mostly protons of very high energy. As these protons traverse the atmosphere they interact with the air molecules, creating new particles. These successive interactions produce a "cosmic ray shower". Some of the shower particles are stopped by the atmosphere, and to detect those the scientists fly their equipment in balloons or airplanes.
Others reach the ground, as those detected by the Spark Chamber. A few penetrate deeply underground and are registered by detectors underground or in deep sea.

Your body is traversed by a few cosmic rays every second, always. Look to the **Spark Chamber** – each flash is a cosmic ray. The Spark Chamber is filled with a special gas.
As the cosmic rays pass through, they ionize the gas along their path. When a cosmic ray crosses both scintillator plates (black plates over and below the chamber), it triggers a violent electric discharge which follows the ionized path, creating sparks like small lightnings which makes the trajectory of this unique cosmic ray visible.

Spark Chambers Production

- Redesign, change of gas to He (normal) – saving huge operating costs
- First order for Ciência Viva Agency (Exhibit "A Aventura Espacial")
- Spark Chamber presented @ Auger meeting, March'2010, Malargüe, Arg.
- Great enthusiam and 2 requests made on the spot:
  - One for the Visitor Centre of the Observatory
  - One for U.Complutense de Madrid
- Spark Chamber being displayed and shown in public events and in international meetings
- Number of requests/orders started to come on a "regular" basis
- On 2014 came an order from CERN for...

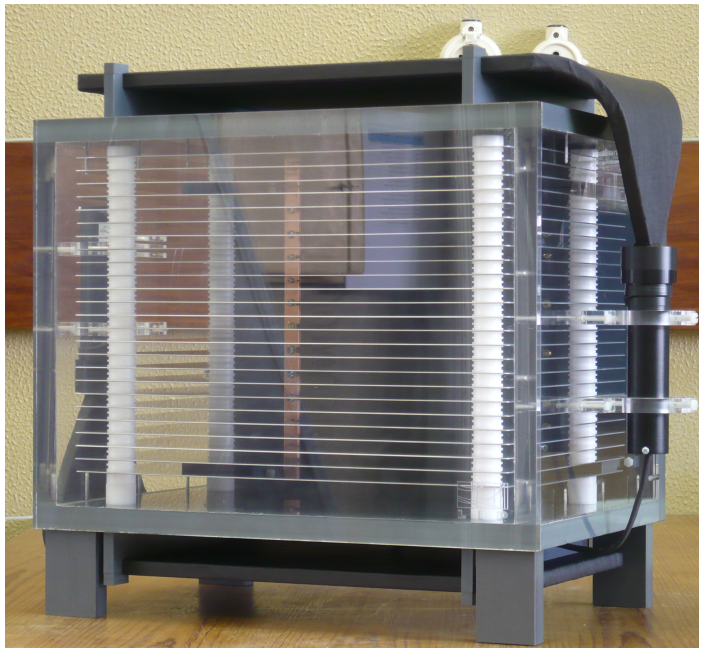
...a Spark Chamber in Egypt

- Spark Chamber delivered to CERN on Sept.2014, moved to the Library of Alexandria in Egypt

- Now the LIP Spark Chamber is present in (11 working +3 in production)

  Portugal(3+2), Argentina, Austria(2), Brazil (RJ), Egypt, Italy, Spain, Slovenja (+1), Sweden

  (requested quotes from: ESA – Noordwijk, NL; São Paulo (Brazil); UNE-Peru)



- Costs: 14 k€(*)
- Delivery time: 6 months

(*)+delivery+insurance+VAT(?)