



LIP – breve apresentação

Mário Pimenta
Lisboa, Fevereiro 2018

// O LIP hoje

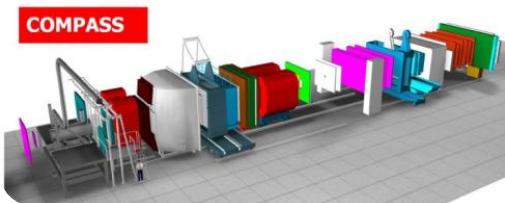
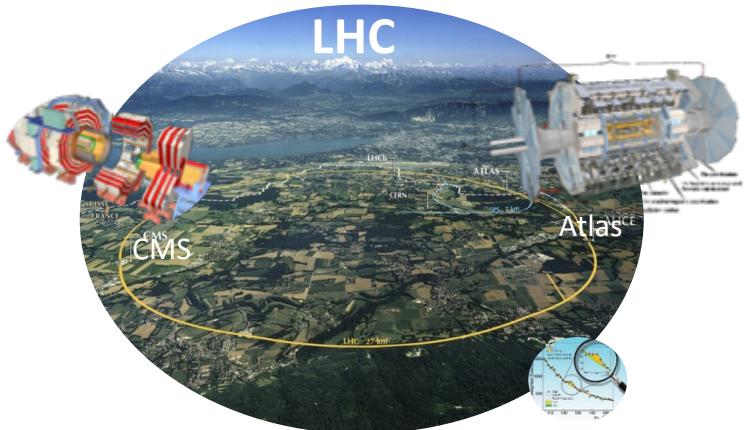


Coimbra, Lisboa e Minho

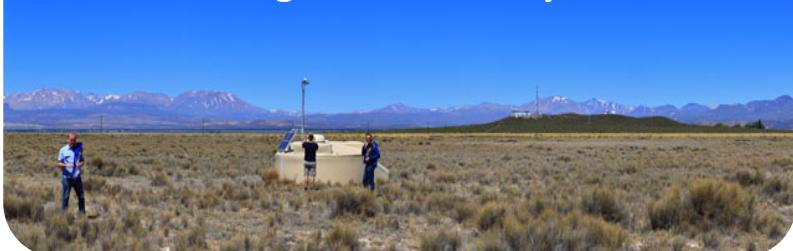
- ~ 200 membros
- ~ 90 doutorados
- ~ 75 estudantes
- ~ 25 engenheiros e técnicos
- 7 administrativos

- **Física Experimental de Partículas e Astropartículas**
- **Desenvolvimento de novos Instrumentos e Métodos**
- **Computação Científica**

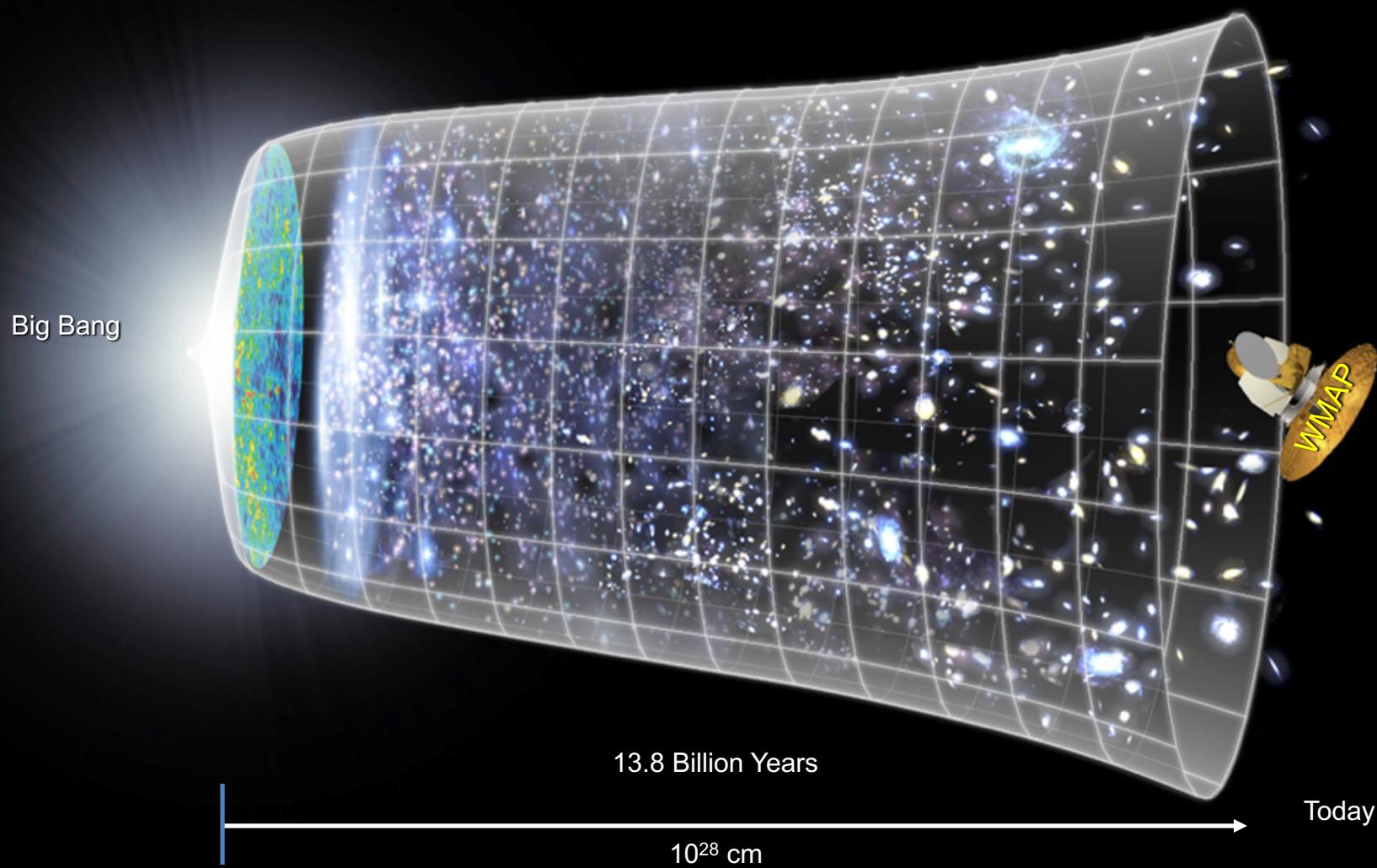
// Do CERN/GSI à pampa argentina, do fundo das minas ao espaço, ...



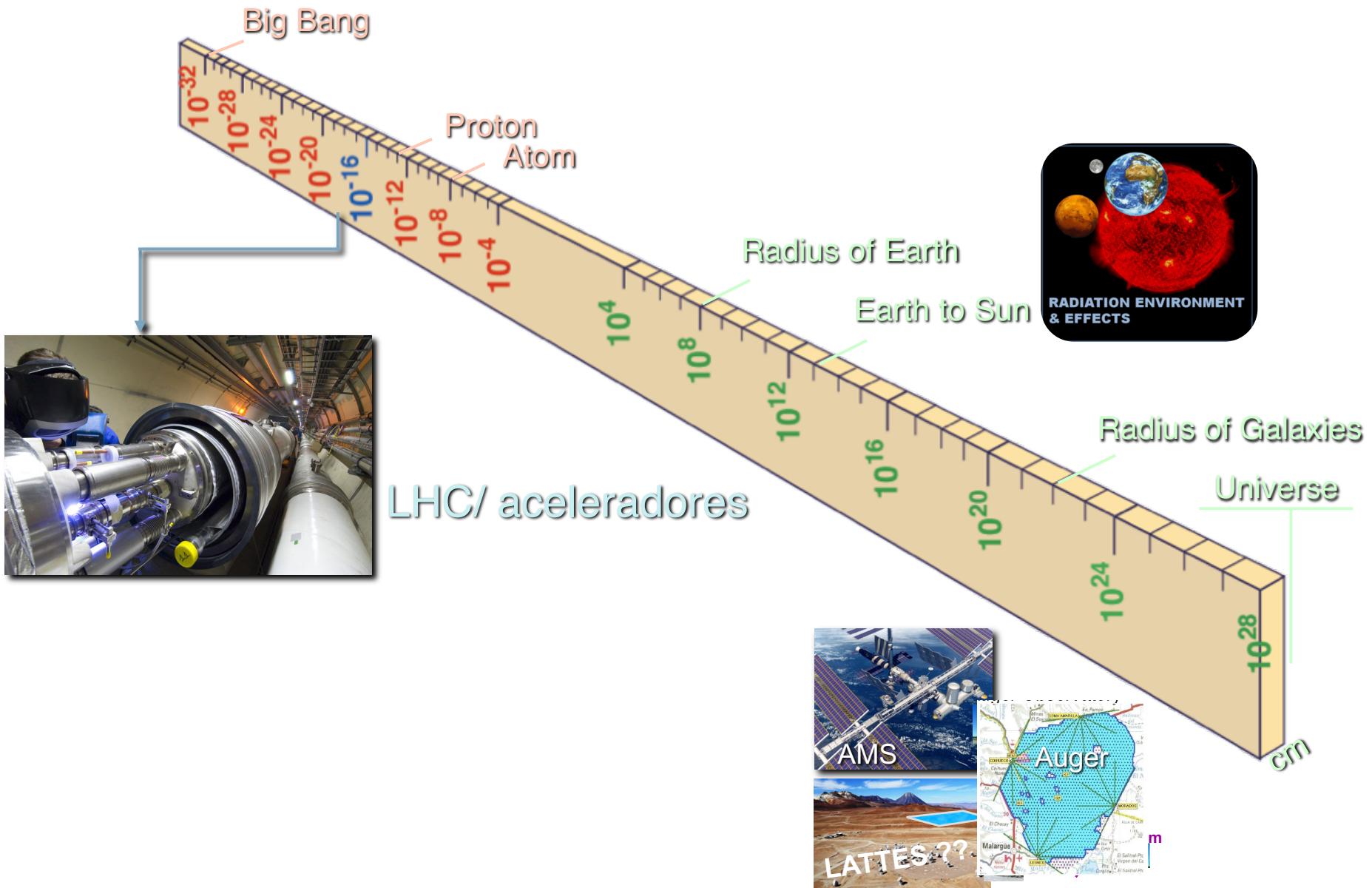
The Pierre Auger Observatory



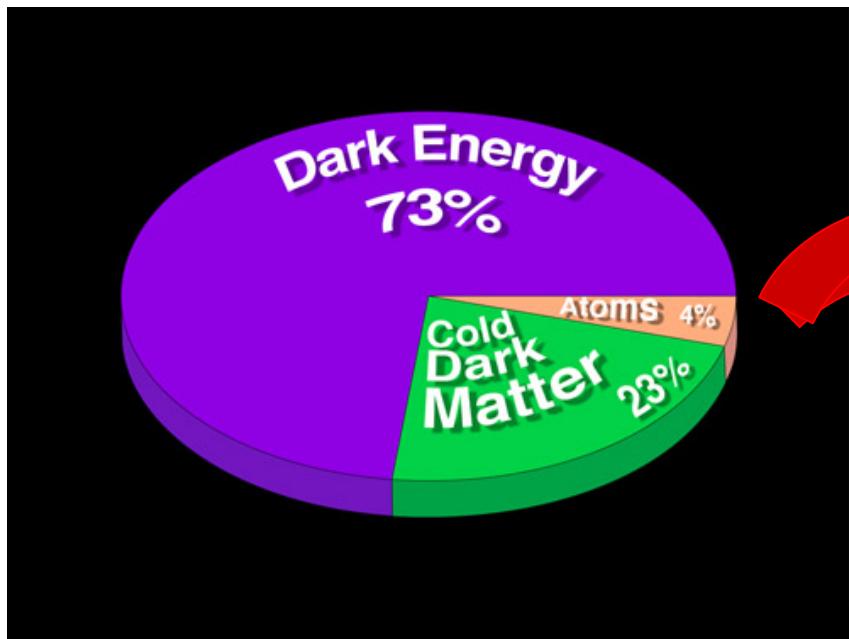
// O Universo para compreender, ...



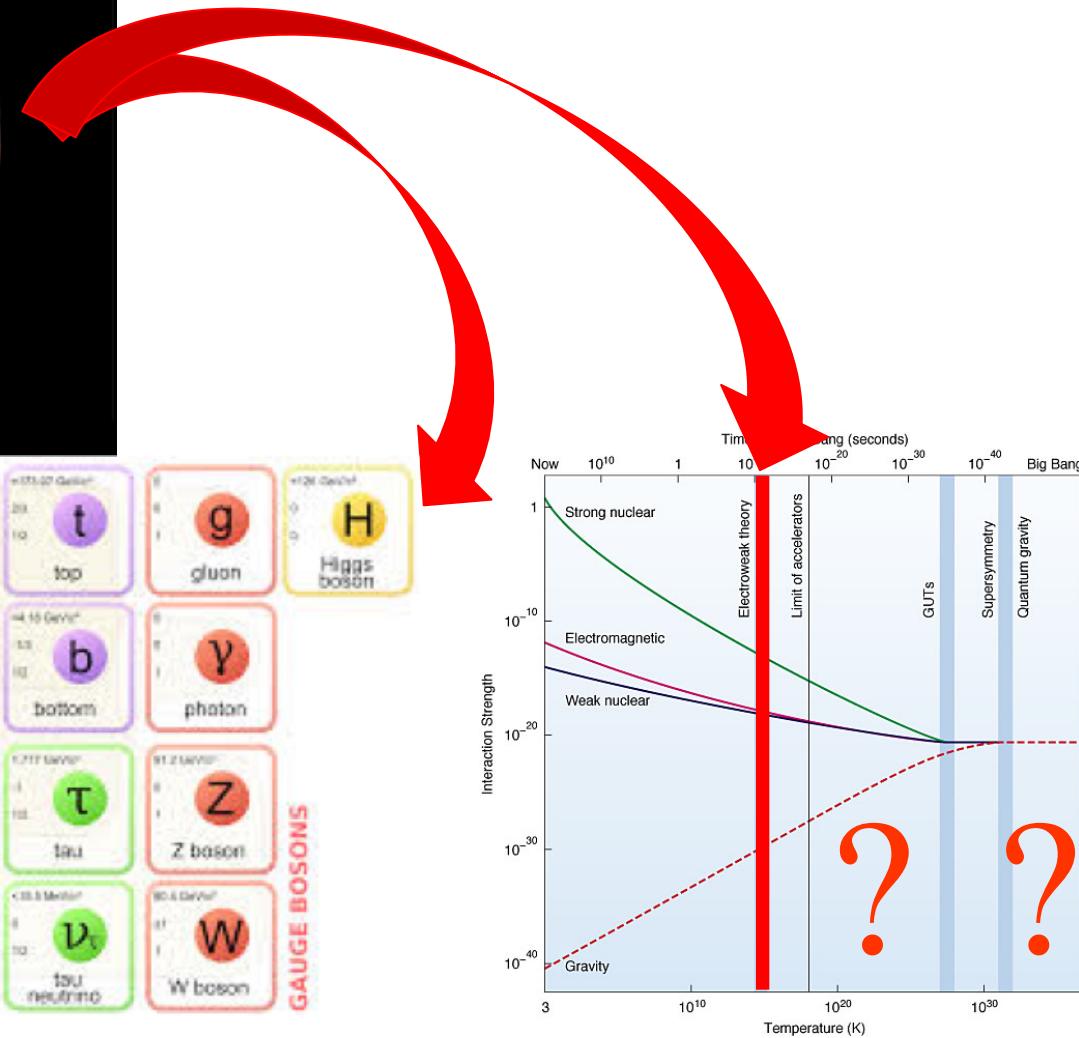
//Escalas, ...



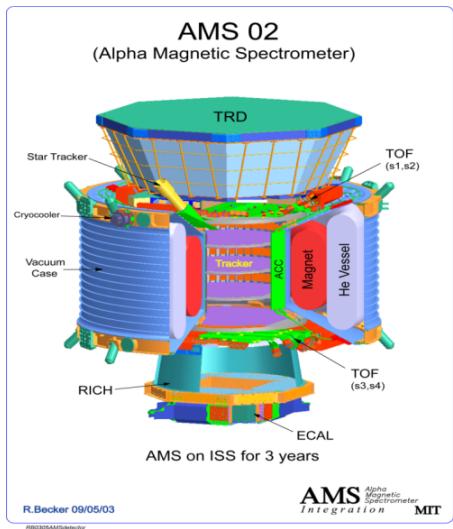
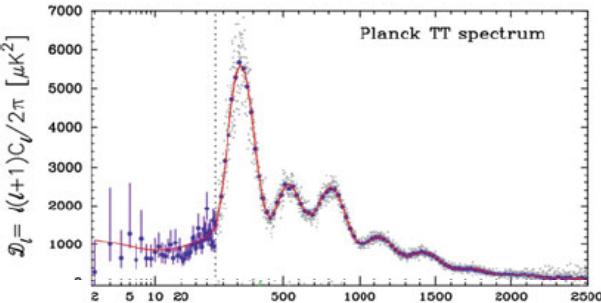
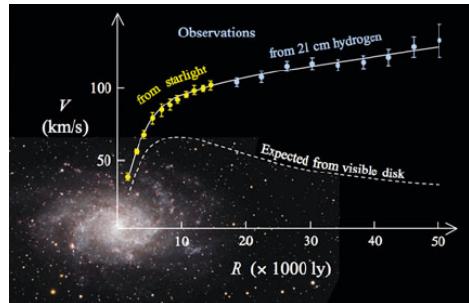
//Fronteiras do nosso (des)conhecimento



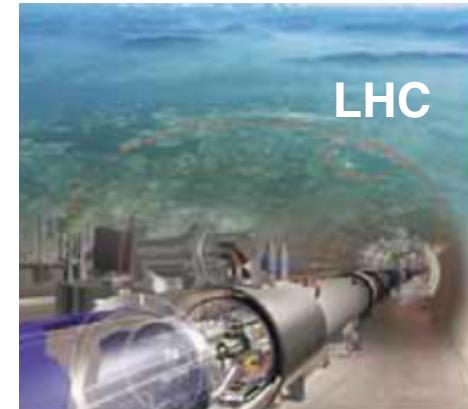
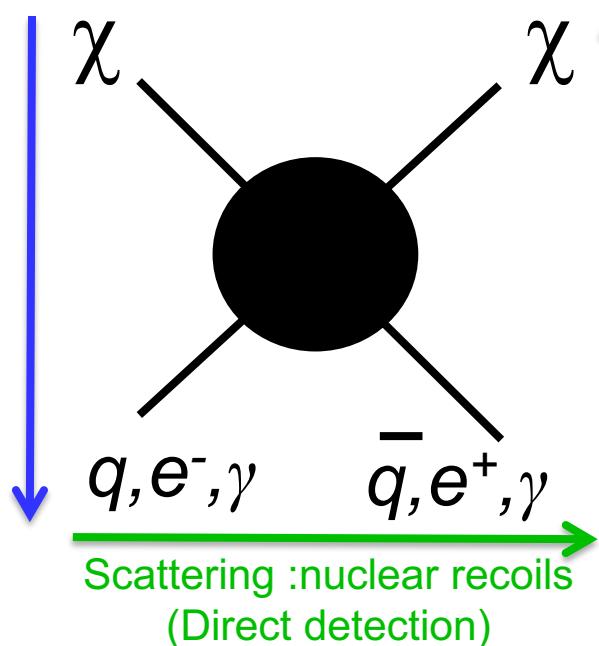
QUARKS		GAUGE BOSONS	
mass: ~0.3 MeV/c ²	charge: +2/3	m: 205-260 GeV/c ²	g: 0
spin: 1/2	color: red	spin: 0	color: yellow
u	c	t	Higgs boson
mass: ~1 MeV/c ²	charge: -1/3	m: 173-27 GeV/c ²	g: 0
spin: 1/2	color: green	spin: 0	color: blue
d	s	b	γ
mass: ~1.7 MeV/c ²	charge: -1/3	m: 4-15 GeV/c ²	photon
spin: 1/2	color: blue	spin: 0	
down	strange	bottom	
LEPTONS		GAUGE BOSONS	
mass: ~0.511 MeV/c ²	charge: 0	m: 80-120 GeV/c ²	g: 0
spin: 1/2	color: red	spin: 0	color: yellow
e	μ	Z	
mass: ~0.000511 MeV/c ²	charge: 1/2	m: 80-120 GeV/c ²	g: 0
spin: 1/2	color: green	spin: 0	color: blue
electron	muon	Z boson	
mass: ~0.178 MeV/c ²	charge: 0	m: 80-120 GeV/c ²	g: 0
spin: 1/2	color: red	spin: 0	color: yellow
ν _e	ν _μ	W	
mass: ~0.0178 MeV/c ²	charge: 0	m: 80-120 GeV/c ²	g: 0
spin: 1/2	color: green	spin: 0	color: blue
electron neutrino	muon neutrino	tau neutrino	W boson



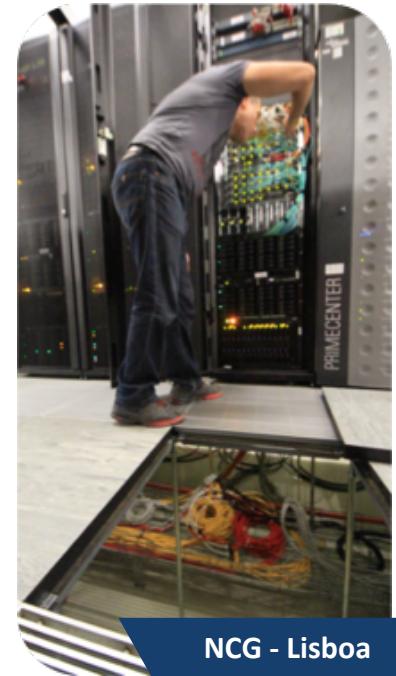
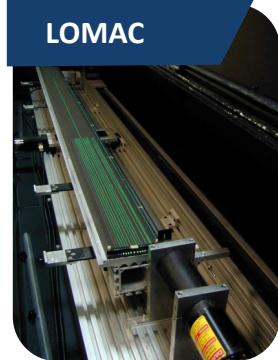
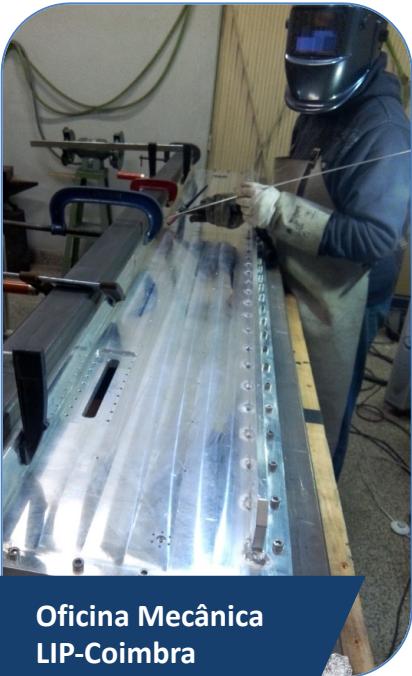
//Dark Matter



(Indirect detection)



// Infraestruturas de investigação em Portugal

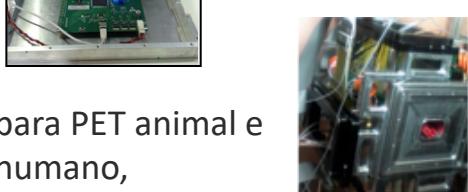


// R&D em detectores e instrumentação

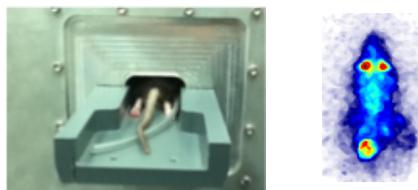
Detectores RPCs



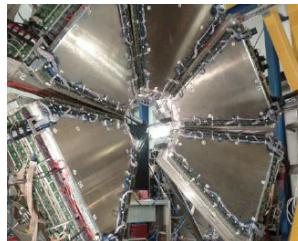
para a pampa,



para PET animal e humano,



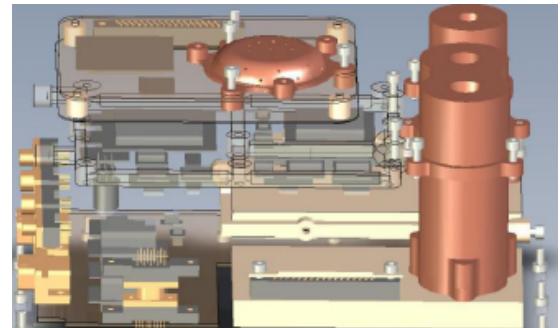
para a Física de partículas



Detectores Xenon



Detectores de radiação em missões espaciais

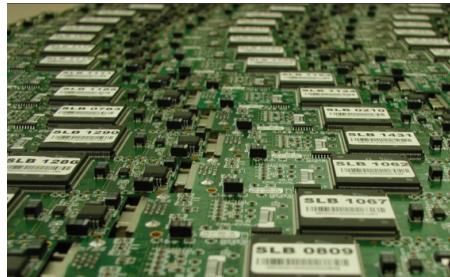


RADEM – Radiation hard electron monitor (LIP: desenho do detector de direcção)

Clear-PEM

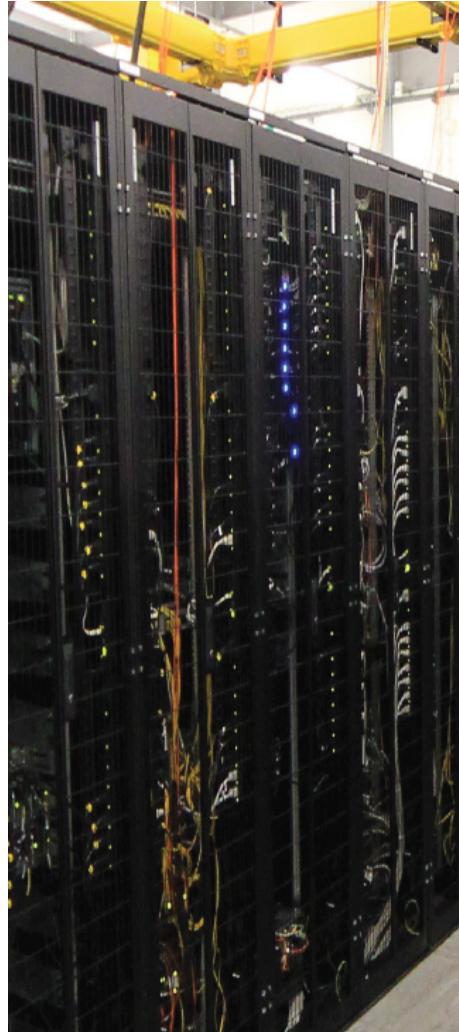


Electrónica digital

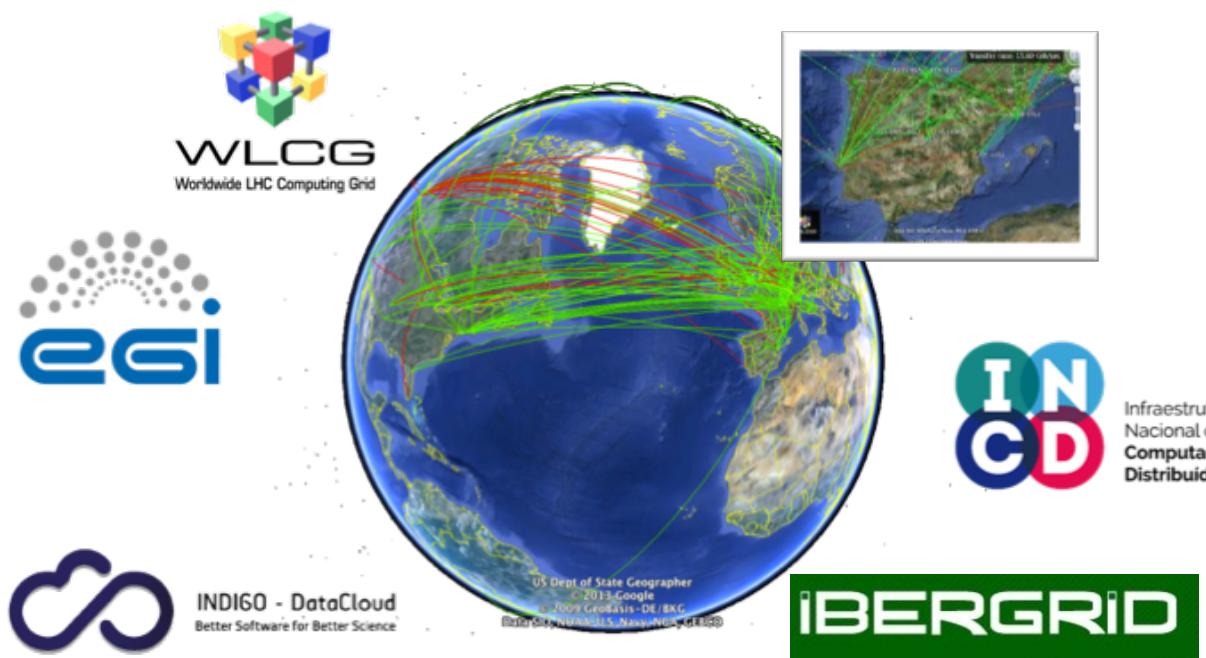


Consórcio nacional liderado pelo LIP

// Computação Científica

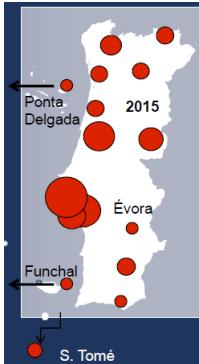


- I&D em tecnologias de informação
- Participação em infraestruturas digitais e consórcios internacionais
- Apoio à comunidade científica



// Ciência e sociedade

Masterclasses



CIÊNCIA VIVA
Agência Nacional para a Cultura
Científica e Tecnológica

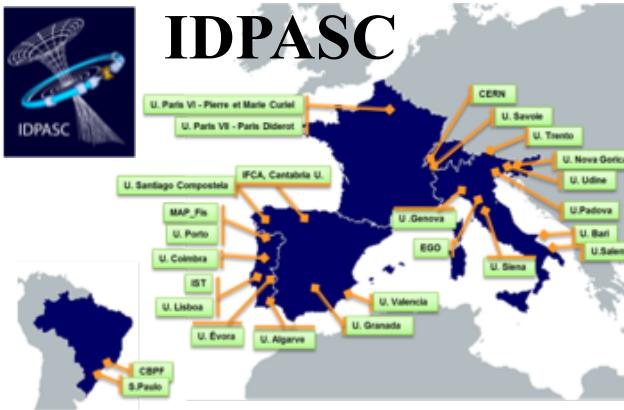
Escolas de Professores em Língua Portuguesa no CERN



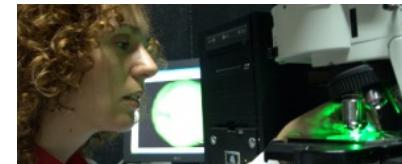
Estágios de Verão



Formação avançada: redes de doutoramento



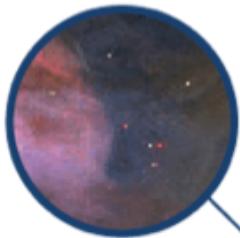
daephys



U. Aveiro, U. Coimbra
U. Lisboa (FCUL) U.
Nova de Lisboa

// LIP R&D

Experimental particle and Astroparticle physics



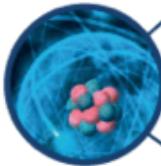
LHC experiments and phenomenology

- ATLAS
- CMS
- LHC phenomenology



Structure of matter

- COMPASS
- HADES

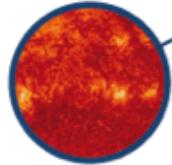


Cosmic rays

- AMS
- AUGER

Dark matter and neutrino

- LUX / LZ
- SNO⁺
- NEXT



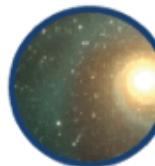
Development of new instruments and methods



Detector development for Particle and nuclear physics

- Neutron detectors
- RPC R&D
- Liquid Xenon R&D
- NUC-RIA

Radiation environment studies and applications for space



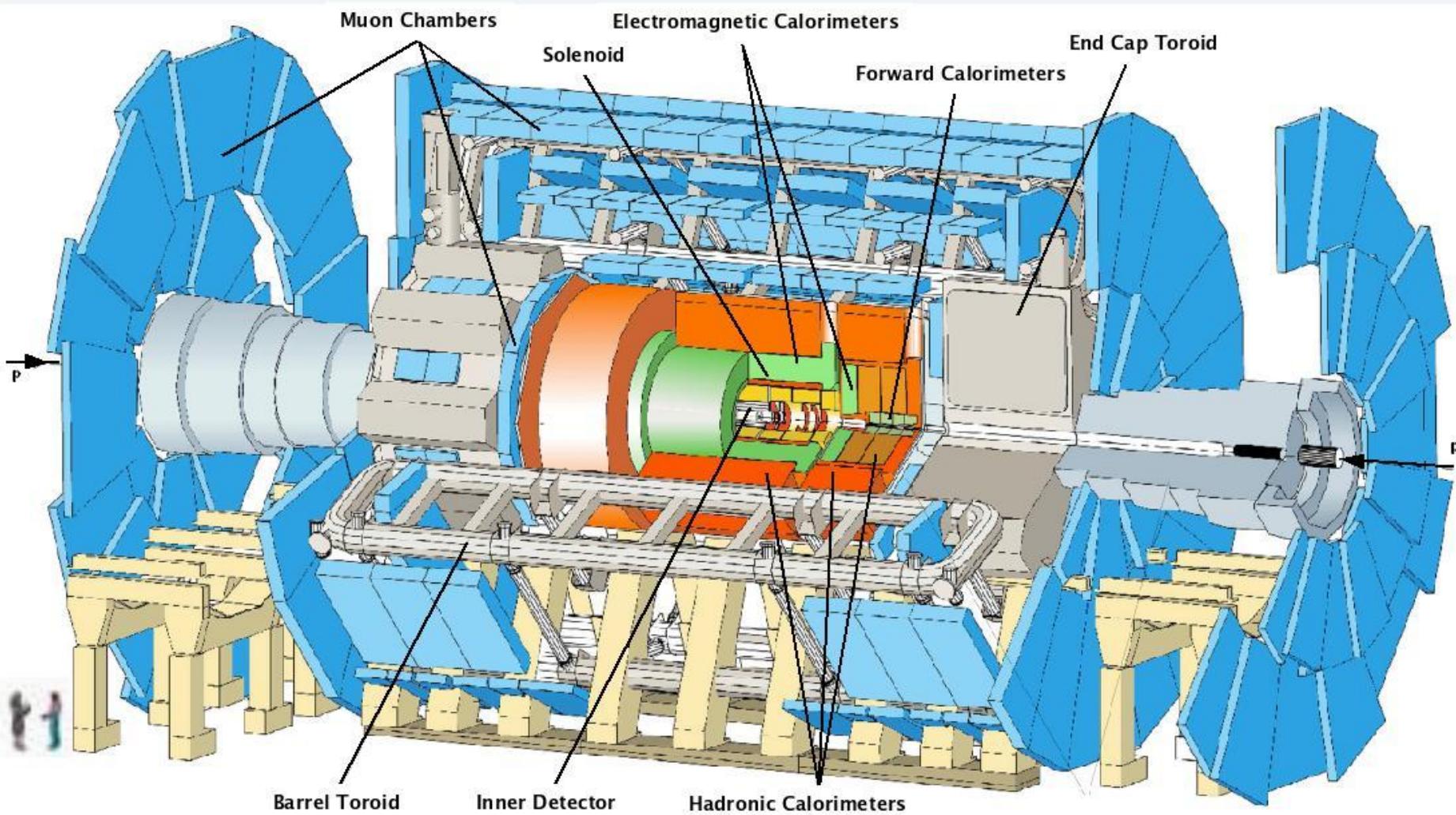
- Space
- A-HEAD



Computing

- GRID
- Advanced Computing

// Os detectores (ATLAS)

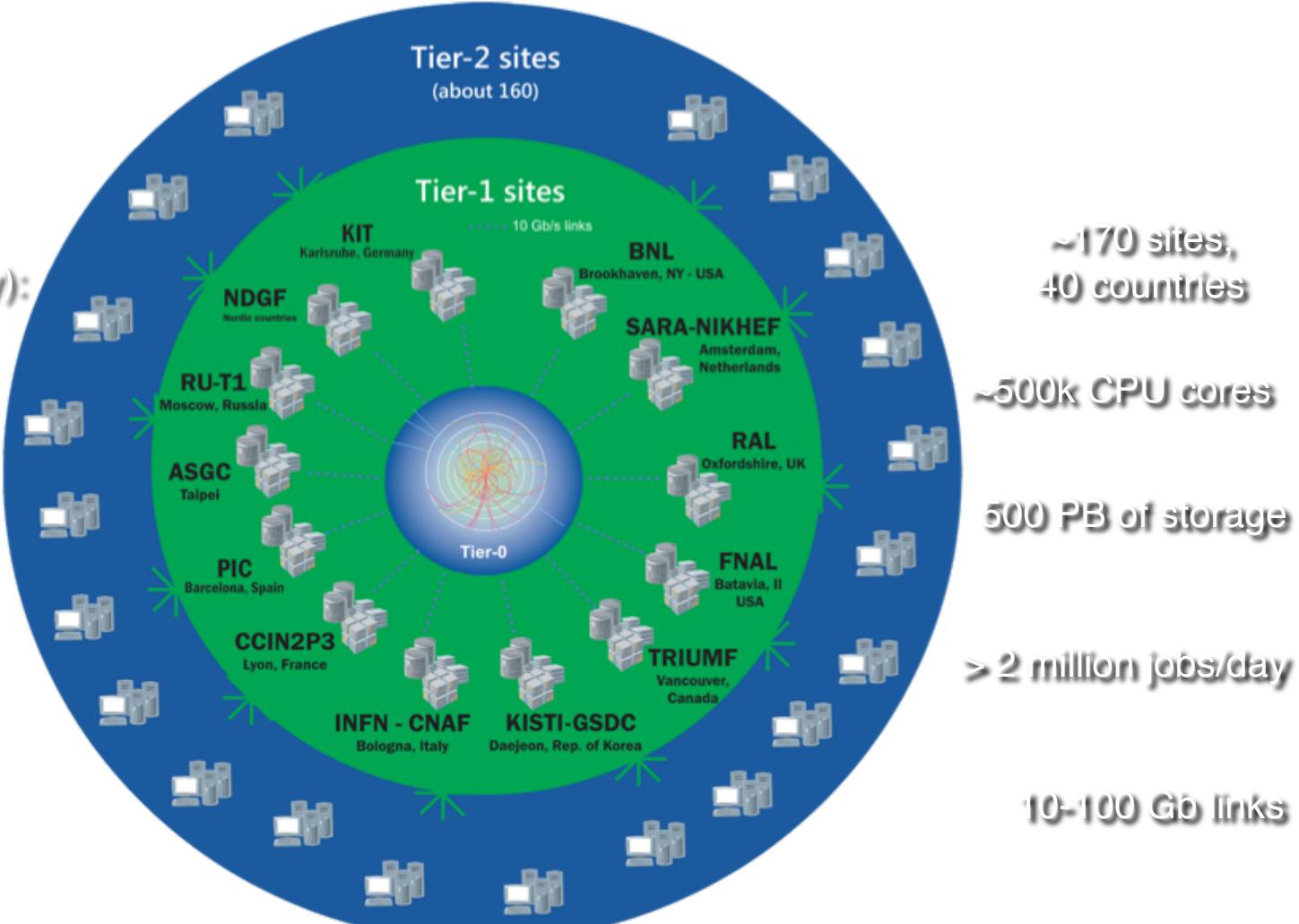


The Worldwide LHC Computing Grid

Tier-0
(CERN and Hungary):
data recording,
reconstruction and
distribution

Tier-1: permanent
storage, re-
processing,
analysis

Tier-2: Simulation,
end-user analysis



WLCG:
An International collaboration to distribute and analyse LHC data

Integrates computer centres worldwide that provide computing and storage resource into a single infrastructure accessible by all LHC physicists