

# First International Workshop for the Design of the ANDES Underground Laboratory

Centro Atómico Constituyentes, Buenos Aires, Argentina, 11-14 April 2011

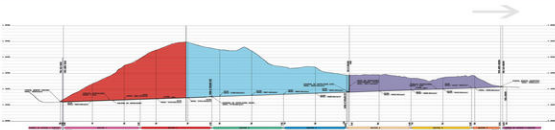
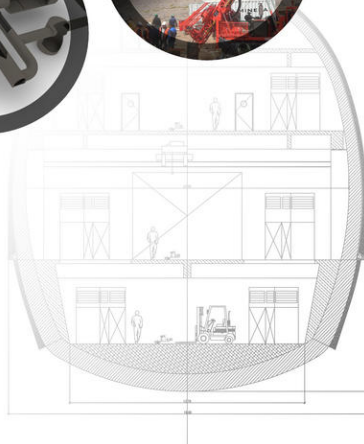


The construction of the Agua Negra tunnel between Argentina and Chile gives the scientific community a unique opportunity to build an underground laboratory 1750m deep under the Earth surface in the southern hemisphere. The opening of the ANDES underground laboratory would be following the one of the Agua Negra tunnel in 2018, but its design has to be finalized in 2011.

The First International Workshop for the Design of the ANDES Underground Laboratory is a call to the international community in order to plan the laboratory according to the growing needs of underground experiments.

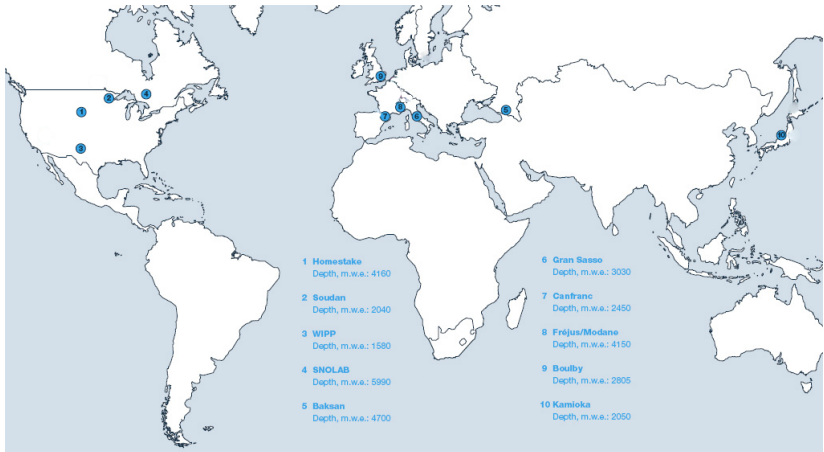
Program and registration: <http://particulas.cnea.gov.ar/andes/>  
Contact: [andeslab@cab.cnea.gov.ar](mailto:andeslab@cab.cnea.gov.ar)

Deadline: 15 March 2011



# Underground Laboratories

# Underground Laboratories



- None in the southern hemisphere

# Southern hemisphere and Latin America?

## South Africa

- ▶ First natural neutrino 1965

## South America

- ▶ Argentina: experiment at Sierra Grande mine (1000 wme)
  - ▶ Search for an annual modulation of dark-matter signals with a germanium spectrometer at the Sierra Grande laboratory  
Astropart.Phys. 10 (1999) 133-139
- ▶ Brazil: search for a mine by Lattes
- ▶ Chile: El Teniente mine prospected

## Latin America

- ▶ Mexico: proposal of the multidisciplinary mexican underground laboratory (LSMM) for Mega Proyectos 2006

# The Agua Negra tunnel

## Andes crossing

- ▶ It is of strategic importance for the region to increase exportation to the Asian market
- ▶ The natural way for Argentina and Brazil is to export by boat through Chile
- ▶ There are various passes. The main one, the Cristo Redentor tunnel from Mendoza to Santiago, cannot fulfil the increasing international demand, especially in winter when it has to close due to strong snows, with thousands of trucks stuck every year
- ▶ Argentina, Brazil and Chile have been looking for years at an alternative based on a low altitude tunnel
- ▶ There have been various proposals for Mendoza - Santiago (train tunnel, Las Leñas pass) and San Juan - Coquimbo (Agua Negra)

# The Agua Negra tunnel context

- ▶ Recently the San Juan - Coquimbo option is favoured
- ▶ A pre-feasibility study started in 2005
- ▶ In 2008 more complex studies and prospectives were made to conclude on the feasibility of the project
- ▶ Cristina Fernández de Kirchner and Michelle Bachelet signed a Bi-National Integration treaty, including the San Juan - Coquimbo option, in October 2009, voted later on by both countries
- ▶ August 2010 MERCOSUR meeting was in San Juan and a strong support for the Agua Negra tunnel was given, with Lula da Silva pushing for the tunnel tender
- ▶ In December 2010 and January 2011 the governor of San Juan met with Sebastián Piñera and his ministers. When Dilma visited Argentina, he presented the tunnel project to her
- ▶ Tender foreseen for October 2011
- ▶ Seems likely that the tunnel construction will start next year
- ▶ Total cost is about 850 MU\$D

# Location of the Agua Negra pass

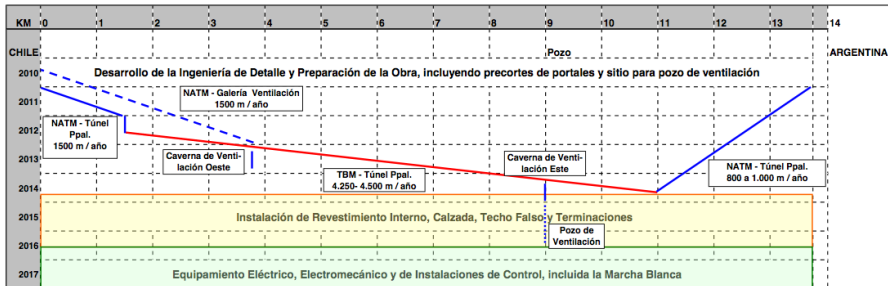




# Tunnel proposed

- ▶ 2 tunnels, 12 m  $\varnothing$  each, separated by 60 m,  $\approx$  14 km long
  - ▶ Argentine entry point at the Quebrada San Lorenzo, 4085 m a.s.l.
  - ▶ Chilean entry point on a ridge, at  $\approx$  3600 m a.s.l.
  - ▶ Internal connexion galleries every 500 m
  - ▶ Deepest point at  $\approx$  1750 m depth
- 
- ▶  $\approx$  3700 m of altitude
  - ▶ relatively remote
  - ▶ “hot” tunnel  $\approx$  30 – 40° C
  - ▶ Ideal depth for an Underground Laboratory ( $\approx$  Frejus-Modane)

# Tunnel schedule



## Inauguration in 2017 (2018?)

- ▶ The laboratory would be in the km 3.5-5
  - ▶ Lab construction starting in 2013 (2014?)

Have the civil work included in the tunnel tender

Need to have factibility studies mid 2011

Cost  $\approx$  1% of lab cost (150 kUSD)

# Workshop Schedule

## Conference-style day

- ▶ centered on neutrino physics
- ▶ two extra presentations:
  - ▶ networks
  - ▶ biology

9h30 -	Registration and Welcome
10h00 -	<b>ANDES Workshop presentation</b>
10h30 -	<i>Bertou and Civitarese</i>
11h00 -	<b>Kemp Ernesto</b>
11h30 -	<i>Detecting supernovae neutrinos: a brief overview</i>
11h30 -	<b>Mosquera Mercedes</b>
12h00 -	<i>Neutrino Cosmology: neutrino mixing and BBN cosmology</i>
13h30 -	<b>Anjos Joao</b>
14h00 -	<i>Experimental Neutrino Physics Activities in Brazil</i>
14h00 -	<b>Mariano Alejandro</b>
14h30 -	<i>neutrino-nucleon scattering at the GeV region</i>
14h30 -	<b>Alonso Jose</b>
15h00 -	<i>DAEdALUS: oscillation and CP violation in neutrino sector</i>
15h00 -	<b>Civitaresse Osvaldo</b>
15h30 -	<i>Neutrino mass limits from double beta decay searches</i>
15h30 -	<b>Lang Karol</b>
16h00 -	<i>Recent results from NEMO-3</i>
16h30 -	<b>Lang Karol</b>
17h00 -	<i>Plans for SuperNEMO</i>
17h00 -	<b>Zukanovich Funchal Renata</b>
17h30 -	<i>Observation of Geonetrinos at ANDES Laboratory</i>
17h30 -	<b>Nunez Luis</b>
18h00 -	<i>Networking Infrastructure linking Virtual Research Communities en Latin America</i>
18h00 -	<b>Juárez Katy</b>
18h30 -	<i>Biodiversity of deep-subsurface microorganisms and their potential application</i>

## Conference-style day

- ▶ description of Underground Laboratories
- ▶ afternoon centered on Dark Matter
- ▶ two extra presentations:
  - ▶ low radioactivity measurements
  - ▶ geophysics

Conference dinner: La Nelly

9h00	
-	Registration
9h30	
-	<b>Bertou Xavier</b>
9h30	<i>The ANDES laboratory configuration</i>
10h00	
Coffee break	
10h30	<b>Noble Anthony</b>
-	<i>Development of the SNOLAB Underground Facility for Astroparticle Physics</i>
11h15	
-	<b>Alonso Jose</b>
11h15	<i>Development and Current Status of Sanford Laboratory at Homestake</i>
12h00	
Lunch	
13h30	<b>Piquemal Fabrice</b>
-	<i>The European deep underground laboratories</i>
14h15	
-	<b>Mosteiro Pablo</b>
14h15	<i>The DarkSide Program</i>
14h45	
-	<b>Gerbier Gilles</b>
15h15	<i>Spherical gaz detector for low energy rare signal search.</i>
15h15	<b>Ortigoza Paredes Ysrael Richard</b>
-	<i>Cryogenic particle detection at the Canfranc Underground Laboratory</i>
15h45	
-	<b>Gerbier Gilles</b>
15h45	<i>Searching for dark matter with cryogenic detectors : from Edelweiss/CRESST to EURECA</i>
16h15	
Coffee break	
16h45	<b>Gerbier Gilles</b>
-	<i>Searching for dark matter with cryogenic detectors : from Edelweiss/CRESST to EURECA</i>
17h15	
-	<b>Molina Jorge</b>
17h15	<i>Search for Dark Matter In CCDs (DAMIC Experiment)</i>
17h45	
-	<b>Aguilar-arevalo Alexis</b>
18h00	<i>Dark Matter experiment with a CCD detector</i>
18h00	
-	<b>Loaiza Pia</b>
18h30	<i>Low radioactivity measurements</i>
18h30	
-	<b>Spagnotto Silvana</b>
19h00	<i>Seismological laboratory in Agua Negra tunnel</i>
19h00	Conference Dinner

<b>Wed 13/04</b>	<b>morning</b>	<b>ANDES Workshop session 1</b>
		Possible experiments in ANDES
		Contacts with other labs, experiments selection protocol
	<b>afternoon</b>	<b>ANDES Workshop session 2</b>
		The Consorcio Latinoamericano de Experimentos Subterráneos
		Academic aspects of ANDES
		Organigram, Chronogram, ANDES Contacts and responsables
		Final summary

## Round table style day

- ▶ starts 9h30
- ▶ ends 18h30
- ▶ lunch at 12h00, 2 coffee breaks at 10h30 and 16h00
- ▶ open discussion

## Presentation to local authorities

- ▶ starts 11h00
- ▶ ends 12h00
- ▶ early coffee break, lunch at 12h00

## Presentation in spanish

- ▶ CNEA
- ▶ Science Ministry
- ▶ CONICET
- ▶ AFA
- ▶ Chile, Brasil and Mexico embassies