Astronomy Instrumentation at UdeC

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CePIA Director

At this moment R.R is in Shanghai , China in a Cs. workshop for the CST project.

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Today 18 people: UG (8) + Ms (4) + PhD (2) + Postdoc (1) + staff (3).

Become a multidiciplinary key facility at UdeC

CePIA-UdeC *est. 07-2015*

- The CePIA laboratory was inaugurated 1.5 years ago.
- Since the have been focused in room T° instr. because of funding const.

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CONICYT
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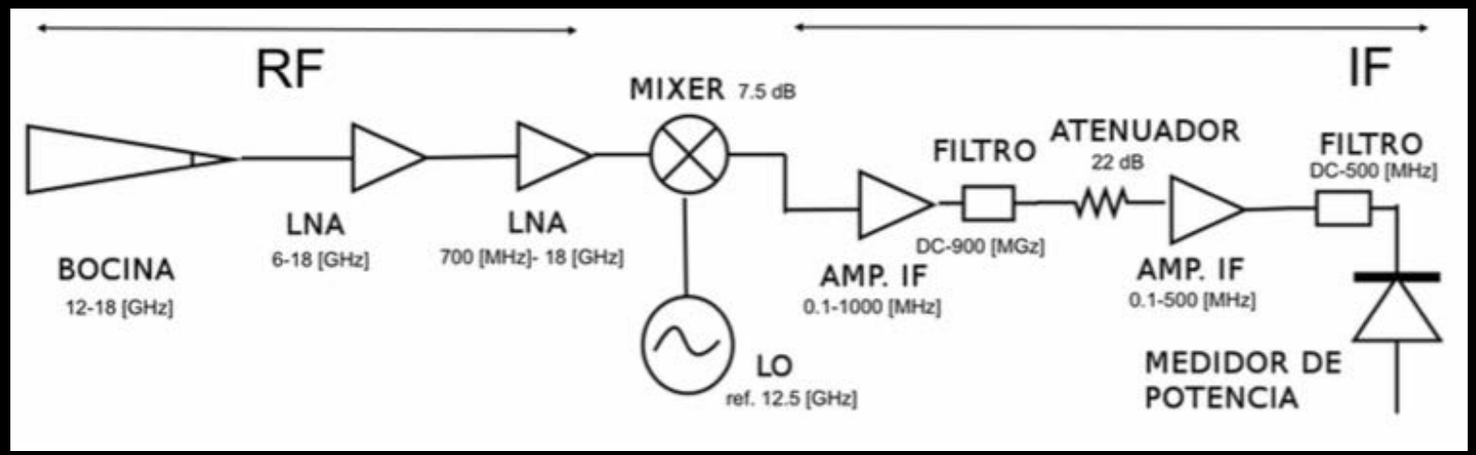
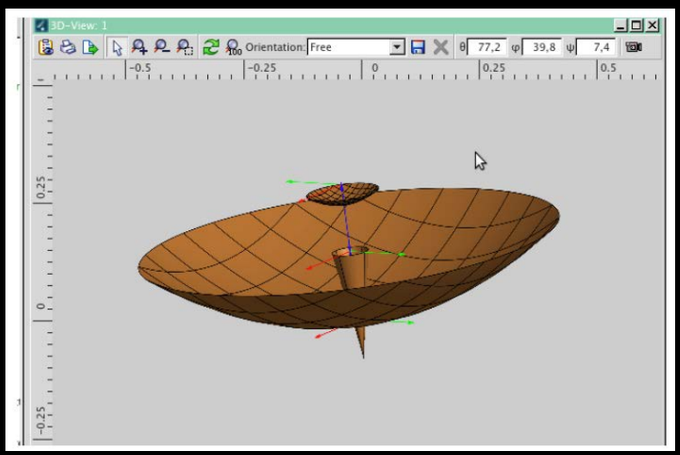
Academic experimentation …

(These activities involved students in UG-G).

The first academic experimentation in 2015:

- Was measurement mean temperature of CMB from Concepción.
- The way we want implement experimentation is provide student with technical knowledge.

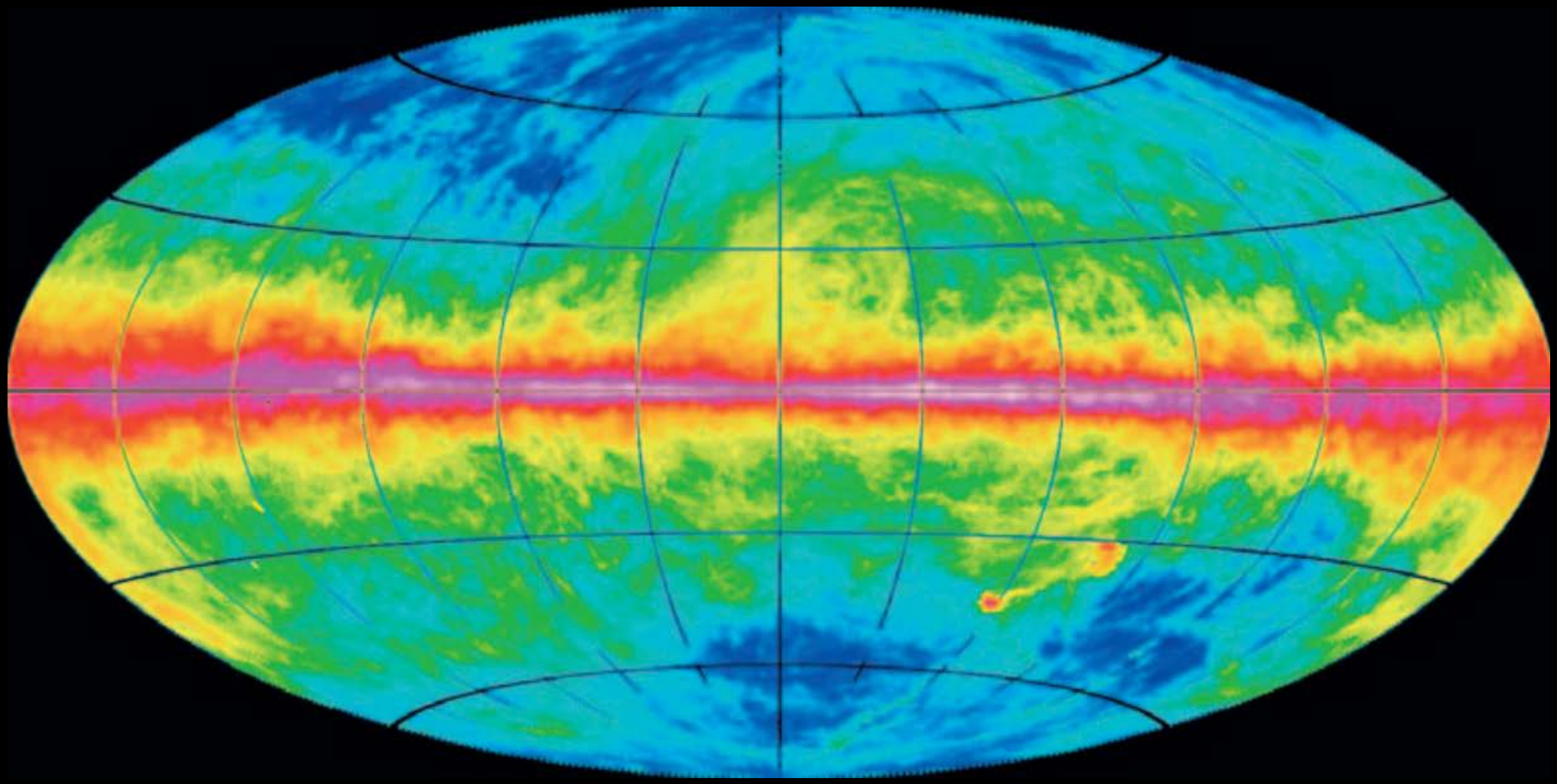




Simulation in software
Receptor design
Uses of instrumentation
Calibration loads design, etc.

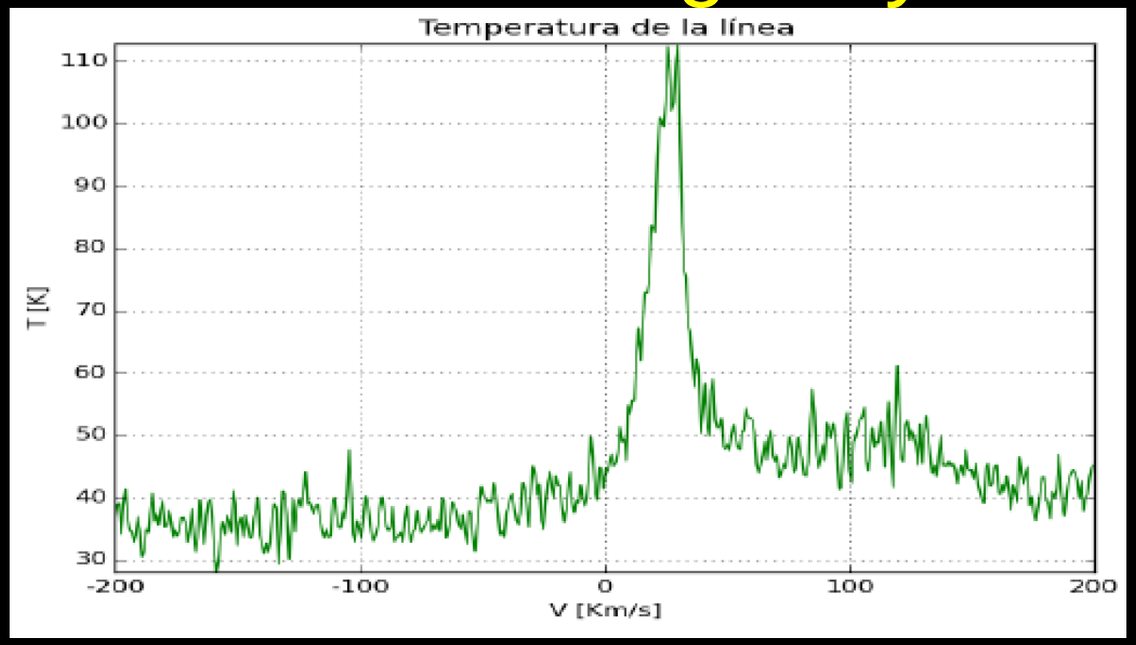
This 2016 the question:

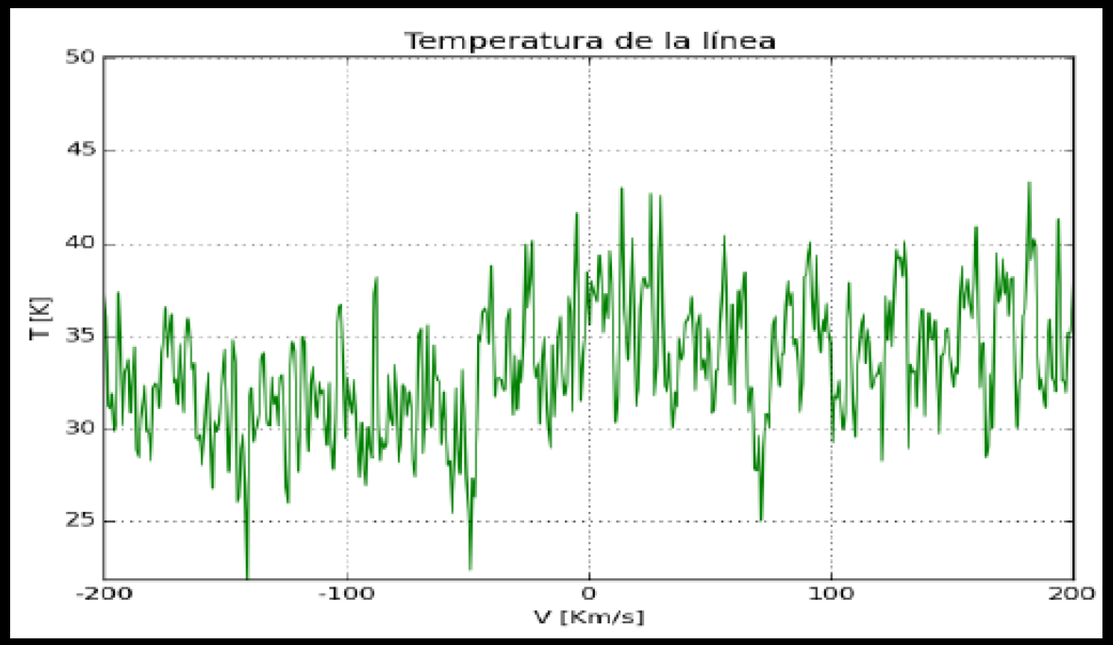
is it possible to measure neutral hydrogen (HI, 1.42 GHz) from our milky way galaxy?

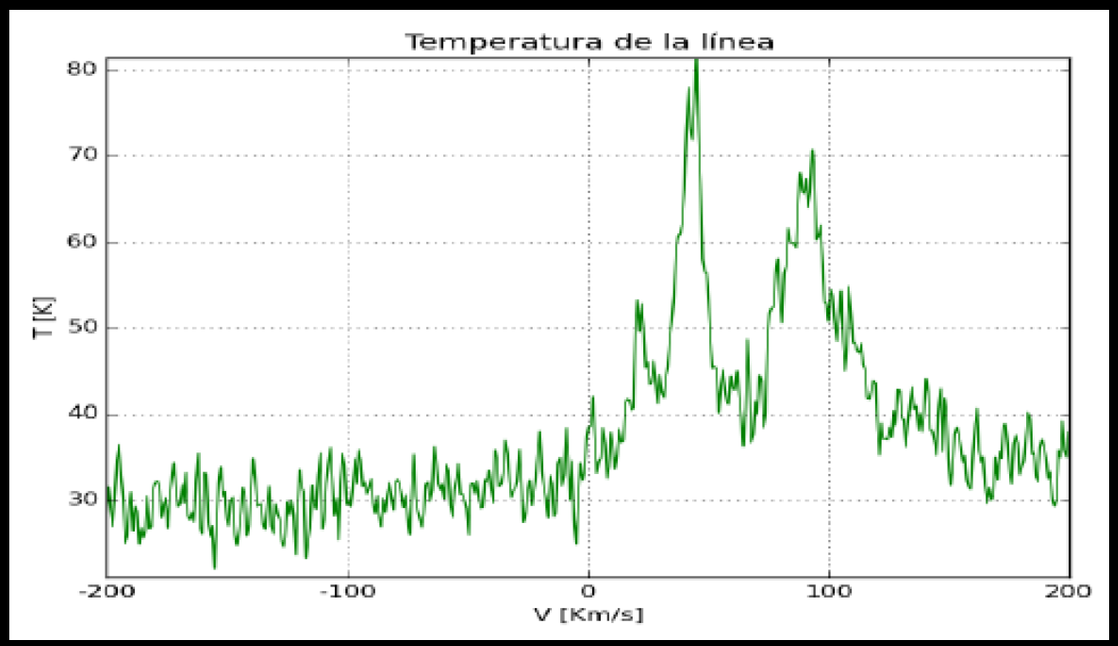


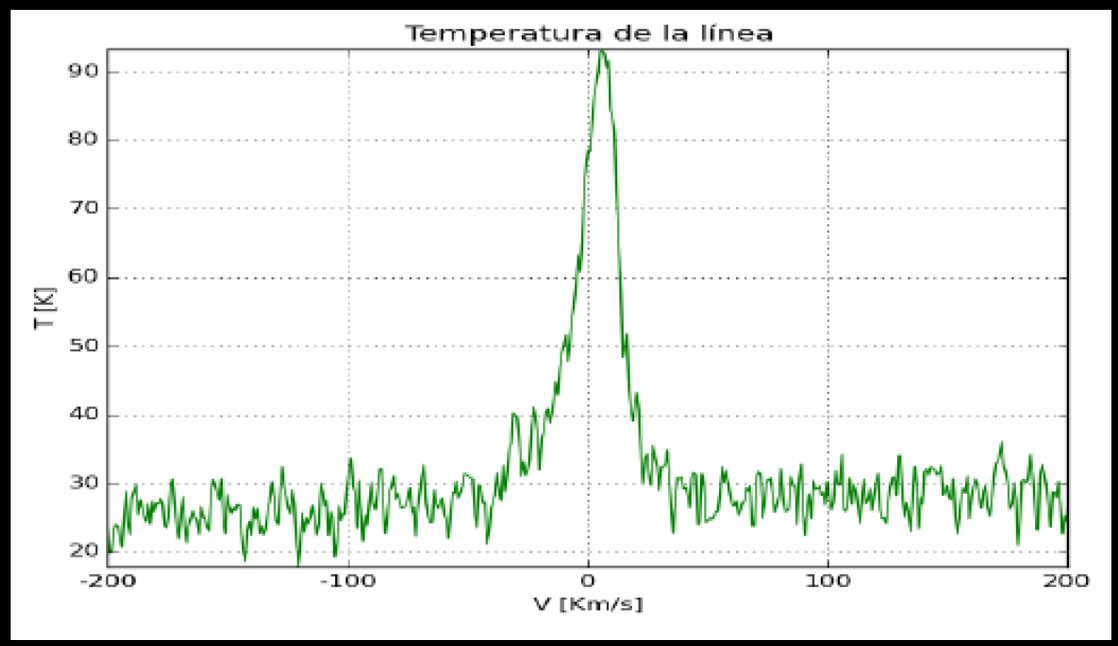
- It show the stages of the antenna assembly.
- This dish is 4.5 meter.
- Receiver assembly.
- Is composed of commercial components.

2016: Neutral Hydrogen (HI) from our milky way galaxy? The answer is Yes!









That show the detection of the hydrogen line and others where there is no line presence.

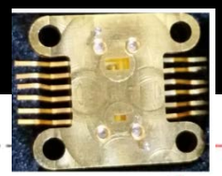
Research and development in mm-wave instrumentation …

present the development of specific devices 183 GHz and 22 GHz WVR are on going and will be show in detail.

QUIMAL: Lab outfit + demonstration of W ater V apor Radiometer at 183 GHz

Conicyt creates the fund Quimal we allowed Lab outfit by research, design, development and demostration of WVR of 183 GHz.

WVR at 183 GHz (K. Cortés PhD thesis)



The radiometer 183 GHz will be important for performing better sensitivity measurement.
The architecture is based on principle of pseudo-correlation and 2SB receiver with non-commercial MMIC chip.
The advantage of such type of instr. receiver P-C is directly proportional to the difference between the sky input and a known temperature load.

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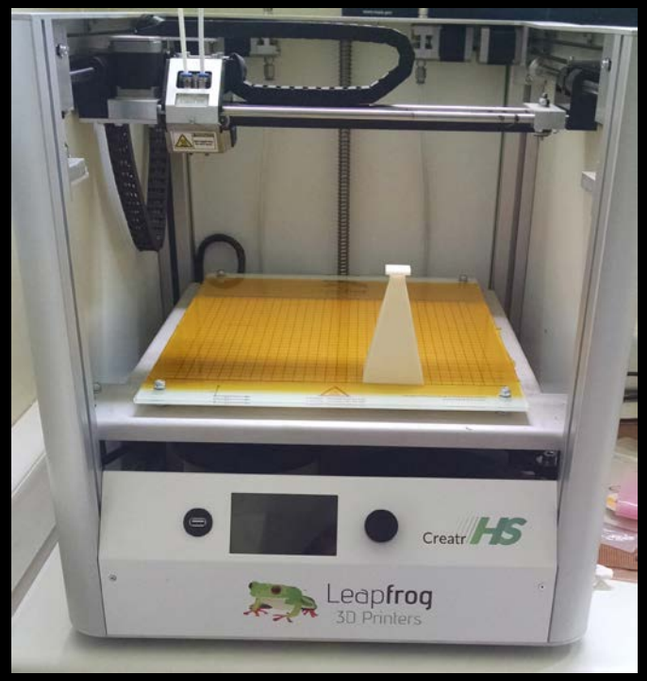
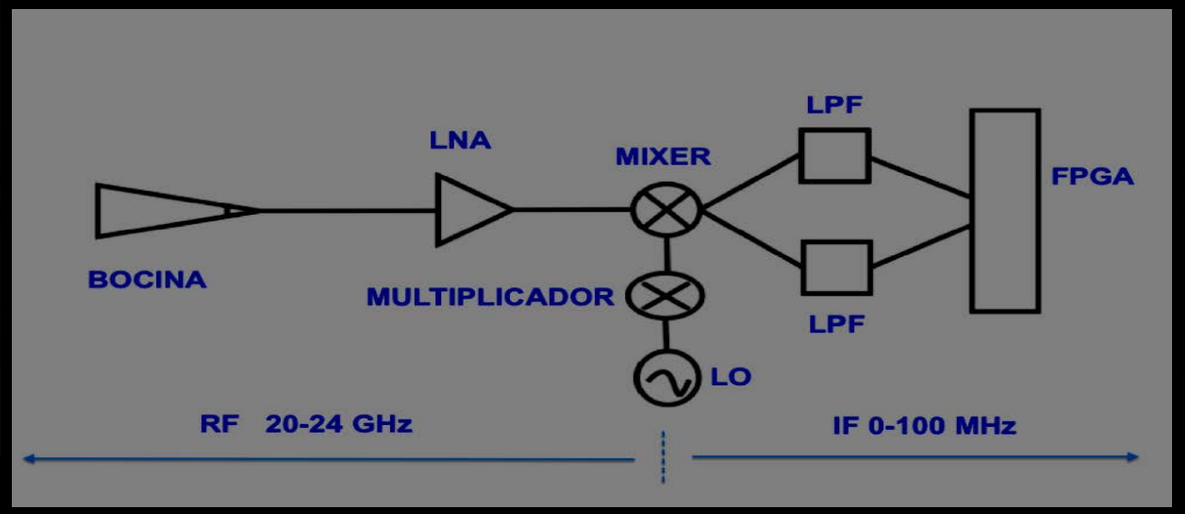
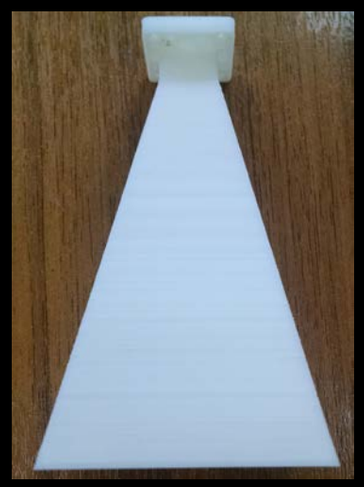
WVR at 22 GHz is tech transfer and low cost design (P. Paredes UG thesis).



Horn (printing 3d)



ROACH / FPGA low cost
(Back end digital)



Which could potentially penetrate in the market due to interest from different scientific and industrial applications.

For example: meteorology, characterization on wood, agriculture, fire detection,etc,

LLAMA project at UdeC

That is to say, intensity calibration loads, 183 GHz WVR and collaborations.

LLAMA

Will be located over 4000 meter.

The site will be in the region “alto chorrillos” Argentina.

Is a telescope independent with 12 meter diameter antenna.

LLAMA Large Latin American Millimeter Array

LLAMA activities at UdeC

(instruments required for this telescope)

- 183 GHz water vapor radiometer, K. Cortés lead (PhD).
- Intensity calibration loads, L. Basoalto lead (UG).
- Colaboration 80-116 GHz dual-pol (B3) receiver, UChile lead.
- Holographic system. (tx: UdeC is responsible for making transmitter and rx: NAOJ).

Let's dreaming big?

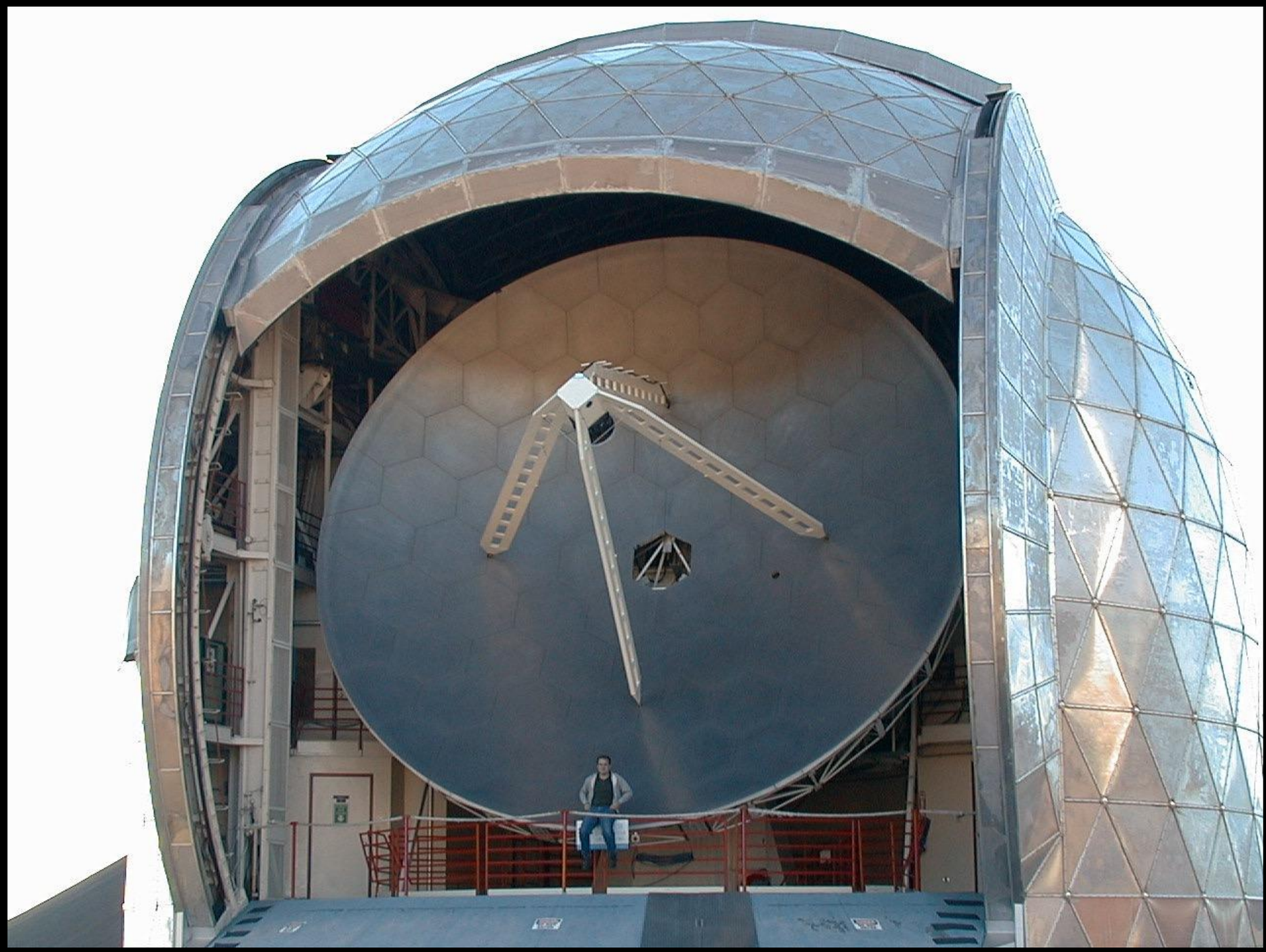
Cosmological Sub-millimeter Telescope (CST)

Aim: Top science, world class sub-mm telescope at a world class site

Telescope: **Caltech Sub-mm Observatory , CSO.**

Now is in Hawaii

Caltech Submilimeter Observatory



The 10.4 meter diameter telescope is housed in a compact dome.
It is possible to disarm and move the antenna in two parts.

Finally, The Site:
which could be on site Chajnantor Plateau or higher

Thank you for your attention!