

# Radioastronomy and Radar Astronomy: Latin American Perspective

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# Why Radio astronomy in Latin America?

- **High Level of Interest in the Science Communities of several countries of the Region**
  - Beginnings of radio astronomy date back to the 60s
  - Growing astronomical community , that reached critical mass
    - (Argentina, Brazil, Chile, México, Venezuela)
  - Promotes regional integration – collaborative science projects
- **Favorable physical conditions:**
  - Optimal sites for millimetric radio astronomy (high, very dry, low levels of man made interference):
    - Chile, Argentina, México
  - Excellent sites with very low levels of interference for radio astronomy/ionospheric radar studies at meter/decimeter wavelengths
    - Perú, Argentina, México, Chile, Brazil
- **Provides Impulse for Development**
  - Leading technologies: antennas, high frequency receivers, etc.
  - Requirement for continent wide broadband linkages
  - Development of human resources
  - Incentive for science education
- **Contributes to regional economies**

# Radio Astronomy in Latin America



México

163/80



Perú



Chile



Cuba

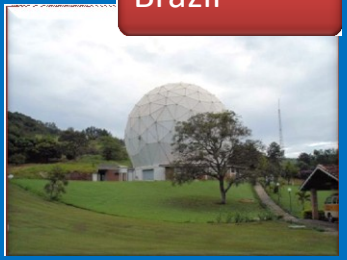
Honduras

Venezuela

Colombia

Ecuador

Brazil



Uruguay

Argentina



Country	Telescope	Observatory	Operating Agency	Frequency Range
Argentina	Antenas I* y II	Instituto Argentino de Radioastronomia	CONICET	~ 1.3- 6 GHz
	Solar Submillimeter Telescope (SST)	CASLEO	Arg (CONICET), Br (U MacKenzie e INPE), Suiza (U Bern) y otros	121 y 405 GHz
	DSA 3*		ESA	8.45 y 32.05 GHz
Brazil	14-m telescope *	Radio Observatorio de Itapetinga	U Mackenzie, FAPESP	22, 30, 43, 48 y 90 GHz
	Galactic Emission Mapping (GEM) -5.5 m telescope		FAPESP	0.408, 1.465, 2.3 y 5 GHz
	Brazilian Decimetric Array		INPE, colab. con India	1.4, 2.7 y 5 GHz
Chile	ALMA*	ALMA	EE UU, Canada, Europa (14 paises + Brazil), Japon, Taiwan (China)	30- 1 000 GHz
	Atacama Cosmology Telescope (ACT)*	Llano de Chajnantor	Princeton Univ.	148, 218, 277 GHz
	Atacama Pathfinder Experiment (APEX)	Llano de Chajnantor	ESO	211- 1 390 GHz
	Atacama Submillimeter Telescope Experiment (ASTE)*	Pampa La Bola	NAOJ, U Chile	330-360 GHz
Mexico	Gran Telescopio Milimetrico*	LMTO (INAOE, U Mass)		70-370 GHz
Peru	Jicamarca Radio Obs (JRO)* Sicaya Radio Telescope*		Instituto Geofisico del Peru, NSF (USA) Inst Geof Peru, NAOJ	50 MHz 4 GHz, 6 GHz

## Chilean Astronomer Makes Her Mark –(BBC, 30 de Marzo, 2012) First science paper published with ALMA data

- “Chilean researcher Cinthya Herrera has not quite achieved her PhD in astronomy yet, but already she has notched up a notable success in her career.”



Antennae: ALMA sees carbon monoxide (orange & yellow) in this composite picture that incorporates Hubble imagery



# The Future

- **Regional Projects:**

- LLAMA: Millimeter Interferometric Network, jointly with ALMA. Argentina and Brazil, with participation of Bolivia, Chile, Colombia, México, Perú, Uruguay and Venezuela

- **Sinergy with astronomy projects in other spectral regions:**

- Large Synoptic Survey Telescope (LSST)
- Pierre Auger Observatory
- Cerenkov Telescope Array (CTA)



**Broadband Requirements:**  
2 000 – 10 000 Mbps (2012), up to  
100 000 Mbps (2030)