

# X-band Technologies

- X-band RF structure High Power Testing (TESTING)
- Creation and Operation of X-band High Power Testing Facilities (TEST AREAS)
- Basic High Gradient R&D (HIGH-GRADIENT)

## IFIC, Valencia Test Infrastructure

**CLIC Collaboration Working Meeting,  
2012-16 Work Packages  
3-4 November 2011**

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**S. Verdú-Andrés on behalf of  
IFIC, GAP (Group of Accelerator Physics)  
<http://gap.ific.uv.es>  
Valencia, Spain**

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► The **European Space Agency (ESA)** and the **Val Space Consortium (VSC)**

(= Universitat de València Estudi General (UV) + Universidad Politécnica de Valencia (UPV) +  
+ City Hall of Valencia + Valencian Regional Governement)

High Power RF Space Laboratory is the **ESA Laboratory** specialized in:

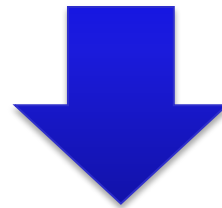
- **RF breakdown phenomena** (Multipactor, Corona and power handling)
  - **Passive Inter-Modulation (PIM)**.
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► The **IFIC Group of Accelerator Physics (GAP)** is participating in:

- development of **medical accelerator** structures  
(cyclinacs in S and C-bands, PARTNER project)
- measurement and data analysis of **high-gradient structures** at KEK and CTF3  
(in collaboration with CLIC RF group)

Strong willingness to join efforts of both communities,  
**Accelerators** and **Space Communications**,  
in the study and measurement of **RF structures** and **associated phenomena**.

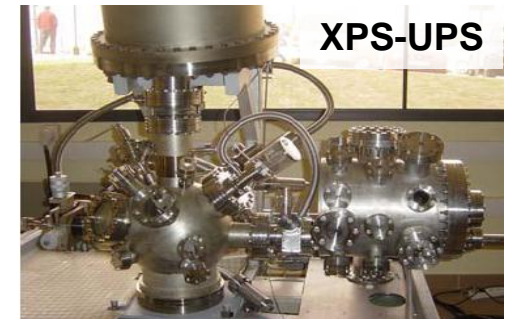
RF breakdown & multipactor study, surface characterization (electronic microscopy, XPS-UPS, SEM), outgassing, nano-layer growing techniques, surface backing, etc.



- creation and operation of **X-band high-power testing facility**  
(high-gradient test stand in X-band (9.3 GHz))
- X-band **RF structure** high-power **testing**

## EXISTING EQUIPMENT

- 5 high-**vacuum chambers** (min. press. 10<sup>-8</sup> mbar),
- **Power amplifiers** from 435 MHz to 30 GHz
- Several spectrum analyzers, network analyzers, ...
- Waveguides, directional couplers, cables, attenuators, circulators, isolators, bolometers and others
- **Multichannel multipactor station** , unique in the world
- Electron sources: electron gun, 90Sr, Hg ultraviolet sources
- **XPS-UPS, SEM, electronic spectroscopy**
- Evaporation system for layer growing and outgassing studies
- 2 clean rooms class 10000 (equivalent to ISO 7)
- + mechanics & electronics workshop (2D and 3D metrology system)



## TO BE FUNDED

- **9.3 GHz pulsed klystron**: 6 MW peak, 6 kW average

# Collaboration Info



<b>Institute:</b>	Valencia, IFIC						
<b>Main contacts:</b>	Angeles Faus-Golfe						
<b>CERN responsible:</b>	Walter Wuensch and Erk Jensen						
<b>Activity/work package/task:</b>	X-band rf/high-gradient test areas/task 4 Related X-band test areas						
<b>Technical subject:</b>	X-band technology development and high-power test area. Main activity is medical X-band linac development						
<b>Working arrangement:</b>	Facility installed in VALspace consortium. Scientific program defined by IFIC						
<b>Funding status:</b>	Applying for funding to Valencia region and someplace else. Decision expected January 2012.						
<b>Formal agreement:</b>	Will be made for this activity after funding approved. CTF3 agreement with IFIC already exists.						
<b>Expected resources</b>		2012	2013	2014	2015	2016	<i>Comment</i>
	<i>Material budget [keuro at current rate]</i>	40	40	40	40	40	applying funding
	<i>Manpower at institute [FTEyears]</i>	2	2	2	2	2	1 technical, 0.5 professor, 0,5 engineer
	<i>Manpower at CERN [FTEyears]</i>	1	1	1	0	0	1 PhD student