# Front-end and Back-end development priorities solicited in this CfP

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# Antennes

RF Membranes:

- Material search for a low loss and low reflection, mechanically robust and UV resistant (ideally UV blocking) membrane for ALMA antennas

- Membrane geometry

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# Front-end

Vacuum windows:

- Development of low loss wideband vacuum windows for high frequency (bands 6-10) ALMA receivers. Important to consider the current requirements:

  - Mechanical, environmental (UV resistant), leak rate etc.

  - Novel, cost effective manufacturing technologies

Automatic tuning of SIS receivers

- For example, gather more inside and statistics on the operation and receiver performance. Then, estimate how much improvement could be achieved, and manpower saved, with an automatic routine, compared to the current situation. Finally, develop a detailed algorithm or a code for implementation in ALMA software.

# Front-end (cont.)

Local oscillators:

- Components and sub-systems development for highly integrated, low power and cost, high spectral purity and low phase noise LO for future receivers.

Focal-plane arrays:

- Research supporting the development of FPA concepts and components.

Sub-mm Integrated Circuits:

- Low Noise Amplifiers, incl. cryogenic

- Integrated down-converters

# Front-end (cont.)

Cryostats:

- Energy efficient cryo coolers

- Novel cryostat design concepts

# Back-end

Frequency and time distribution

- Novel architectures and design to distribute reference signals for frequency and time across the ALMA array

Analogue to Digital conversion

- Ultra high-speed ADC devices and concepts

  - E.g. optical ADCs

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# Correlators and the rest …

Energy efficient hardware solutions for correlators and off-line data processing:

- Graphical Processing Units:

- Optical processing

  - Hybrid, optical/electrical, concepts

  - Photonic Integrated Circuits

- Neuromorphic computing

# Connect with ESO

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# Thank you!

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