

<b>HERSCHEL PACS</b>	Test Plan and Procedure for Detector Spectral Measurements at LENS	Doc. ref. : PACS-ME-TP-002 Issue/Rev. : Draft Date : 24-04-01
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# Test Plan and Procedure for Detector Spectral Measurements at LENS

***First Draft !***

	Name	Function	Date	Signature
Prepared by	R. Katterloher		24-04-01	
Checked by				
Approved by	R. Katterloher	SE		
Approved by		PA		
Approved by	N. Gradmann	CCO		
Authorized by	O.H. Bauer	PM		
Authorized by	A. Poglitsch	PI		

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## 1. SCOPE

The document describes the activities necessary to perform the “detector module spectral measurements” at LENS. The detailed test procedure is included in this document. The filled-in test procedure is considered as test report.

The test is intended to verify the detailed spectral response of all Ge:Ga detector pixels of QM module #10 including the fore-optics under background loads close to the later operating conditions. The relative spectral response of selected detector pixels was determined so far only by a FTS measurement at ANTEC.

The test is intended also to get familiar with operation of the TUFIR source adapted to the special needs of PACS detector calibration. In this respect, the test serves as a pre-test and as an opportunity of optimising the system for the later PACS instrument wavelength calibration.

## 2. DOCUMENTS

PACS-ME-PL-003

PACS-ME-PL-012

PACS-ME-PL-007

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### 3. VERIFICATION MANAGEMENT

As stated in the PACS Test Plan, all test activities are performed under responsibility of the institute organization, represented by the local coordinator. The HERSCHEL PACS test manager is responsible for coordination and execution of the detector spectral test plan.

The HERSCHEL PACS PA/QA organization will monitor the test activities. Facility and test surveillance will be covered by the PA organization of the institute responsible for the execution of the test.

Anomalies or difficulties identified during the test will be treated as follows:

- A) Stop test
- B) Identify whether the anomaly is in the unit or in the test set-up
- C1) No failure: Continue testing, report in logbook
- C2) Failure in the test set-up: Repair the failure and continue the test. If test results have been invalidated, the test team will redo the test, if it does not overstress the unit(s)

Activities are recorded in the logbook.

- C3) Failure in the unit: Raise a NCR and process it in accordance with the PA-Plan.

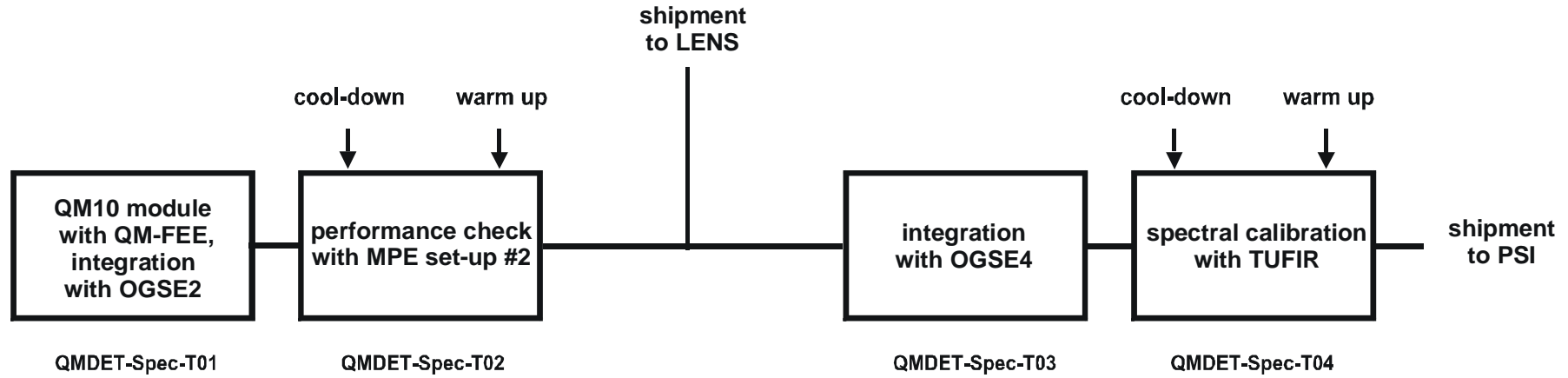
#### **4. TEST PLAN**

Sequence / Description / Schedule

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Figure 1: Test Sequence



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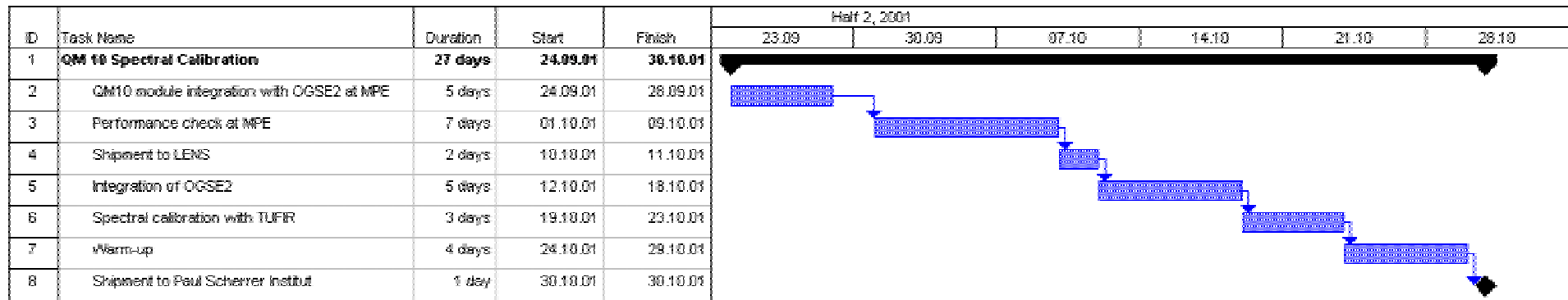


Figure 2: Schedule Detector Spectral Measurement

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## 5. TEST FACILITIES

### 5.1 MPE Detector Read-out Electronics Set-up #2

### 5.2 OGSE 2 Detector Module Test Optics

- OGSE 2 consists of a LHe-dewar with optics (providing the right IR-background) and
  - a tunable infrared source (OGSE 4) for the spectral investigations on the Ge:Ga pixels
  - OGSE 2 will be located at LENS for this test
  - a 100 MeV proton source for the high energy particle spike (transient) investigations
  - OGSE 2 will be located at PSI for this test
- OGSE 2 design is shown below

### 5.3 OGSE 4 TUFIR Wavelength Calibrator

- The tunable IR-source TUFIR is based on a third order mixing of coherent radiation emitted by two carbon dioxide lasers and microwaves generated by a synthesizer on a metal-insulator-metal diode. The principle is shown below. A complete coverage of the FIR spectral range is provided. The spectral calibration requirements for PACS are defined in PACS-ME-PL-003.
- OGSE 4 is located at LENS
- OGSE 4 is operational, adaptation of the beam to the specific needs of PACS is necessary

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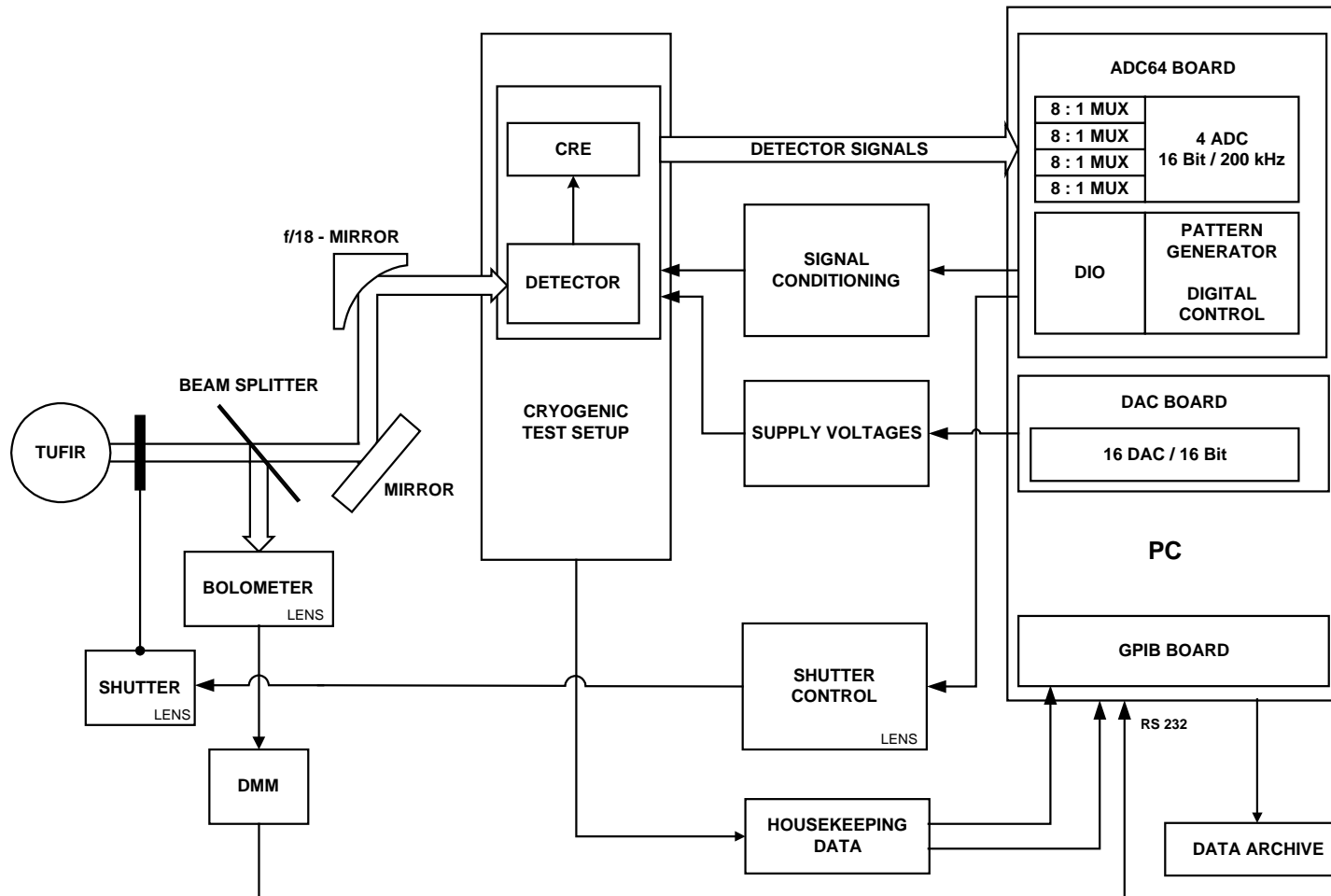
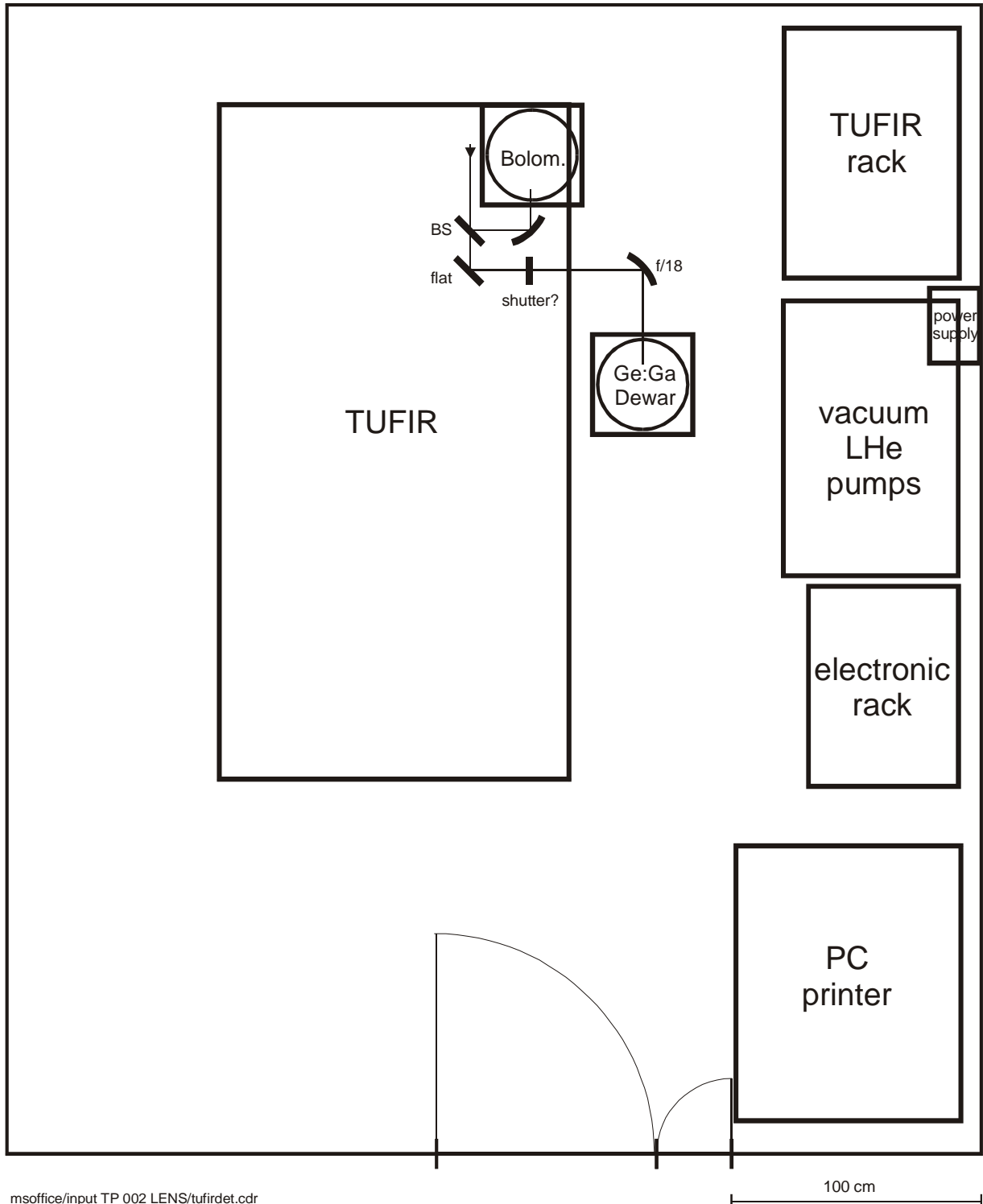


Figure 3: Blockdiagram of Detector Read-out Test Set-up #2



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**Figure 4: Proposed arrangement of components in the laboratory**

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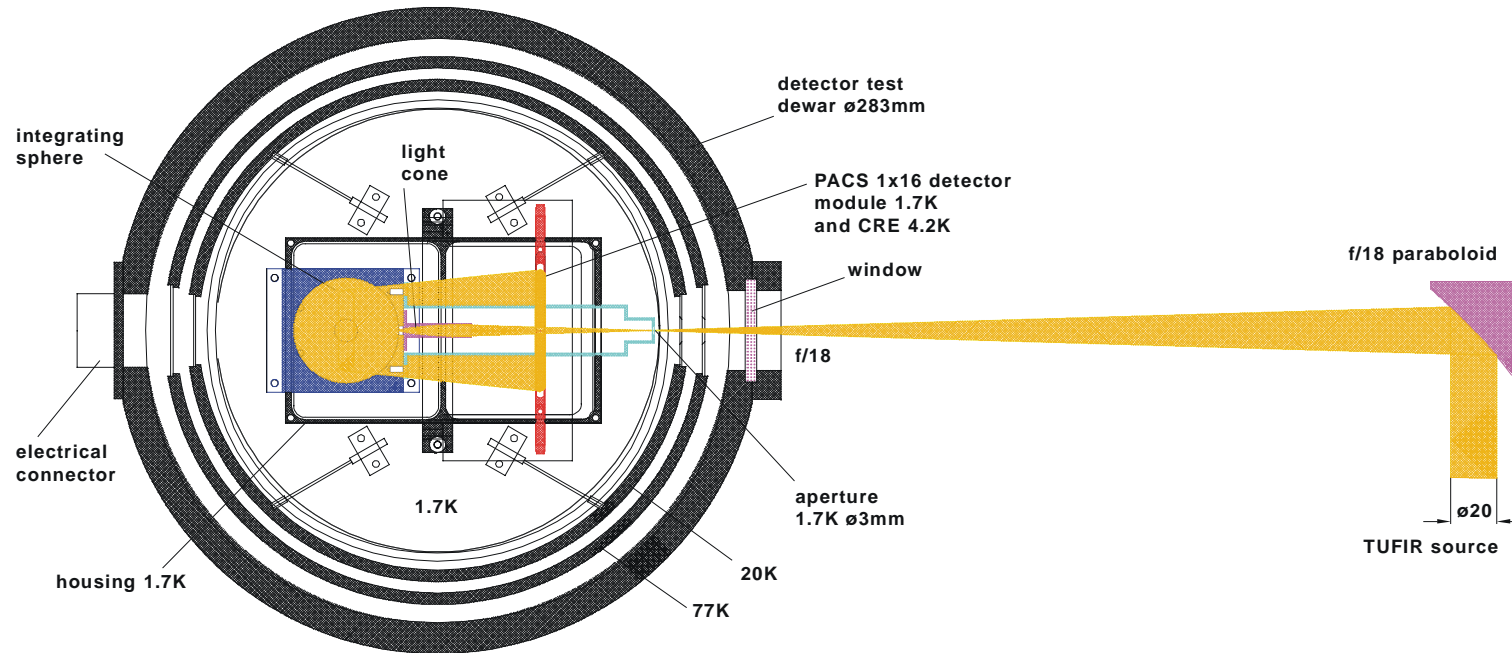


Figure 5: OGSE 2 Cross Section horizontal

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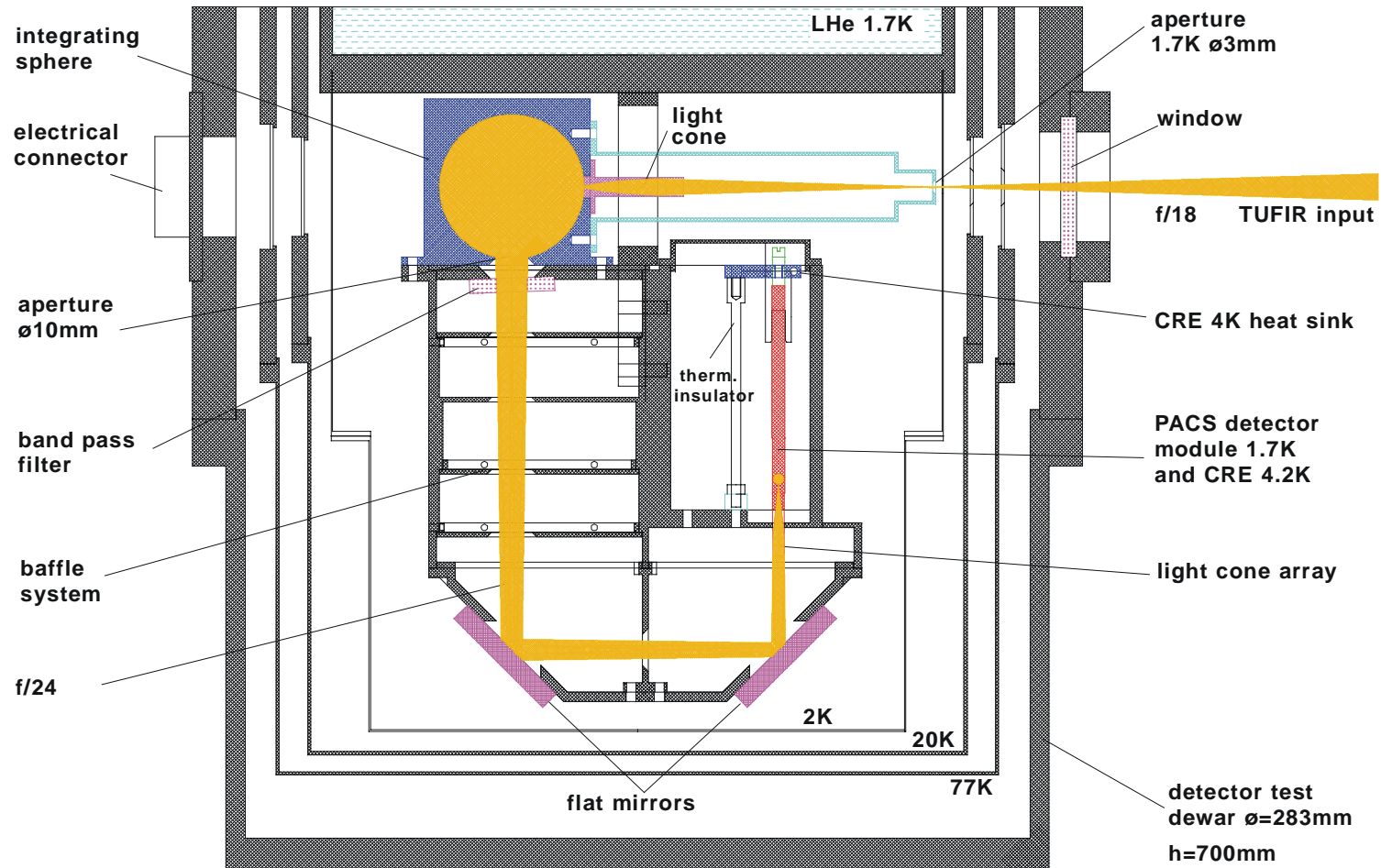


Figure 6: OGSE 2 Cross Section vertical

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**6. TEST PROCEDURE**

Program and procedure to be detailed !!

Proposed parameter ranges:

TUFIR spectral range 58  $\mu\text{m}$  to 220  $\mu\text{m}$ ,

set of about 50 lines spaced by 5 - 2  $\mu\text{m}$  (see list provided by LENS)

TUFIR power ON and OFF per line

detector operating temperatures: 1.8 K, 1.9 K

detector bias voltage: 30 mV, 50 mV, 70 mV

CRE ramp integration time: 30 ms and 300 ms

number of averaged ramps: 100

Response measurements a) without using the wavefront modulator

b) using the wavefront modulator at TBD frequency



**7. TEST RESULTS RECORDING**