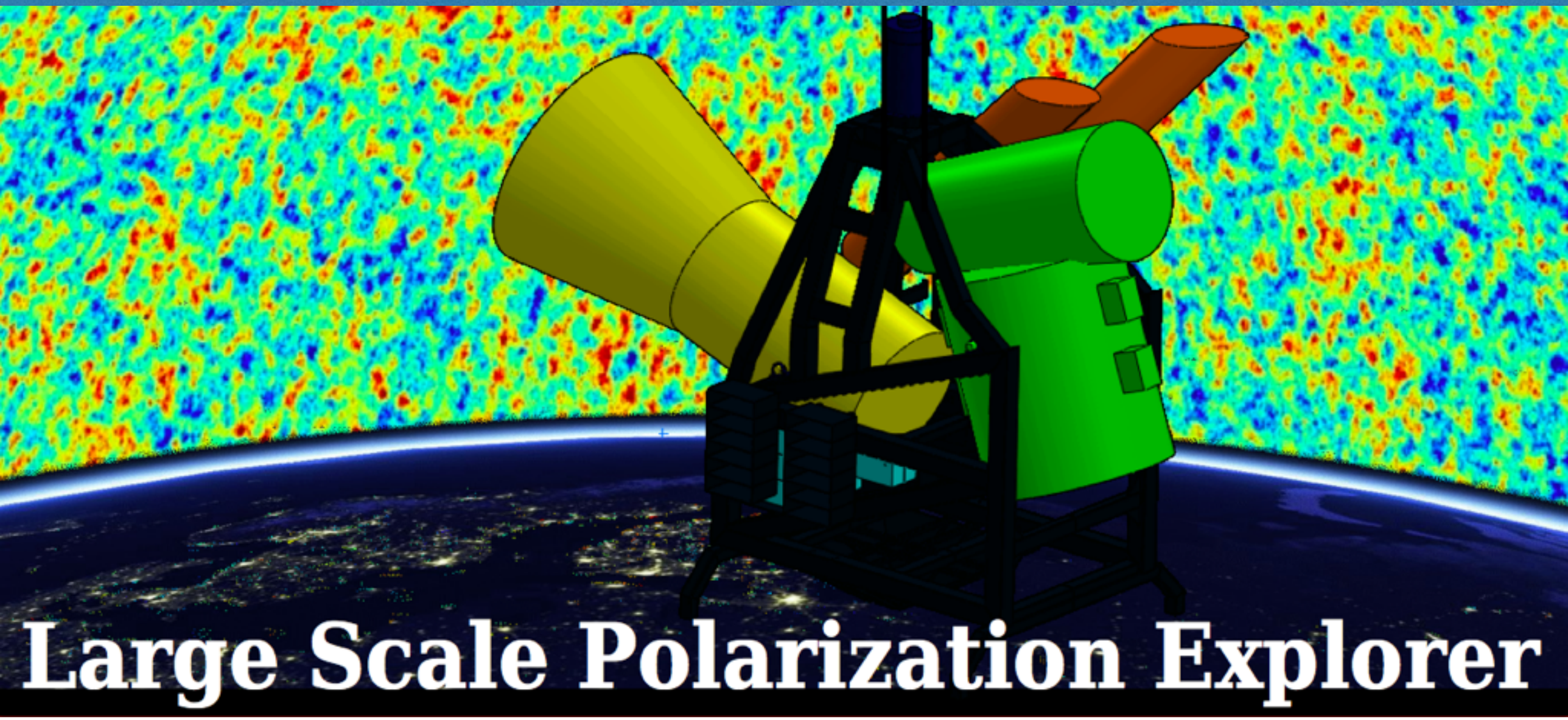
LSPE

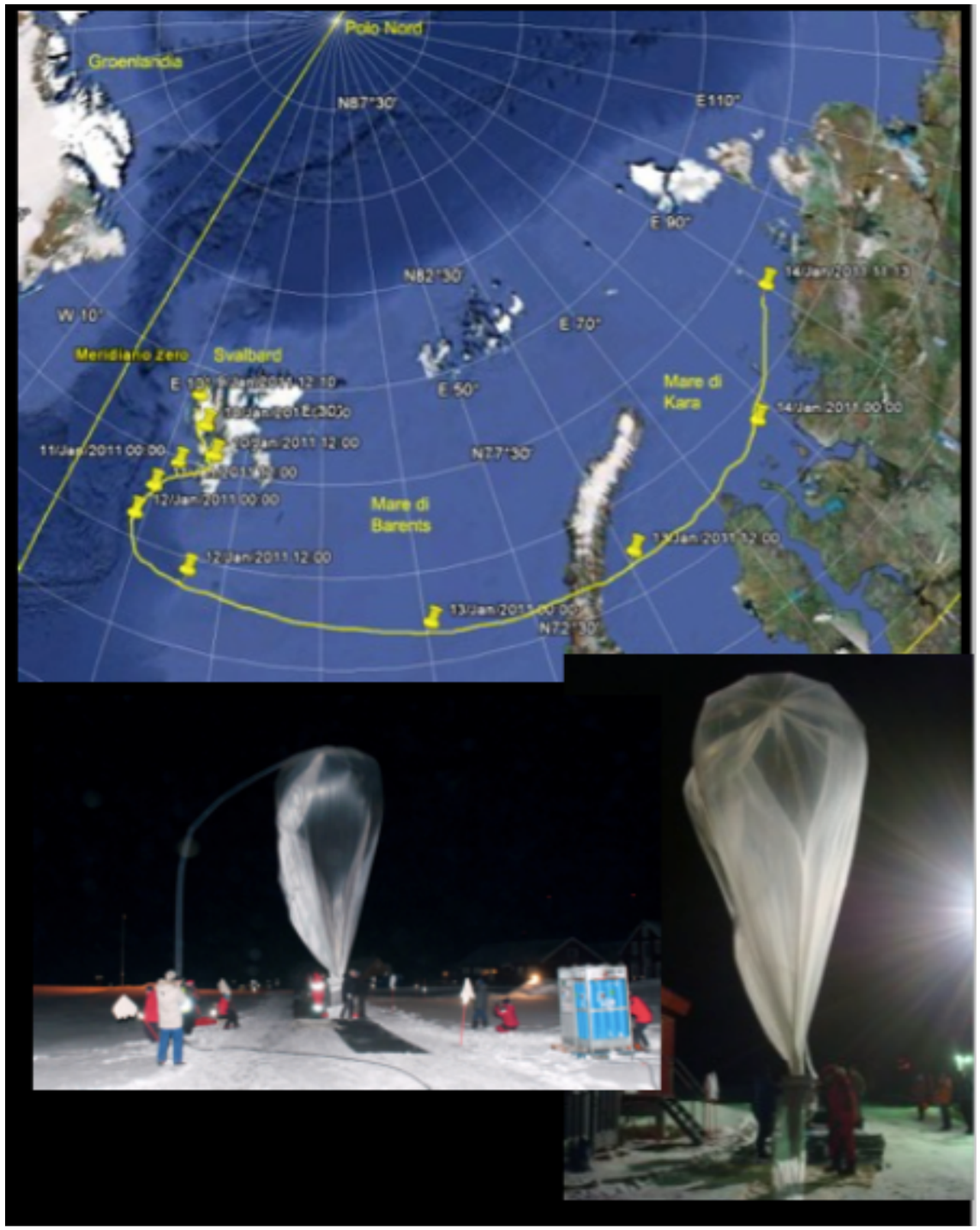
Cds Preventivi 2016

Flavio Gatti

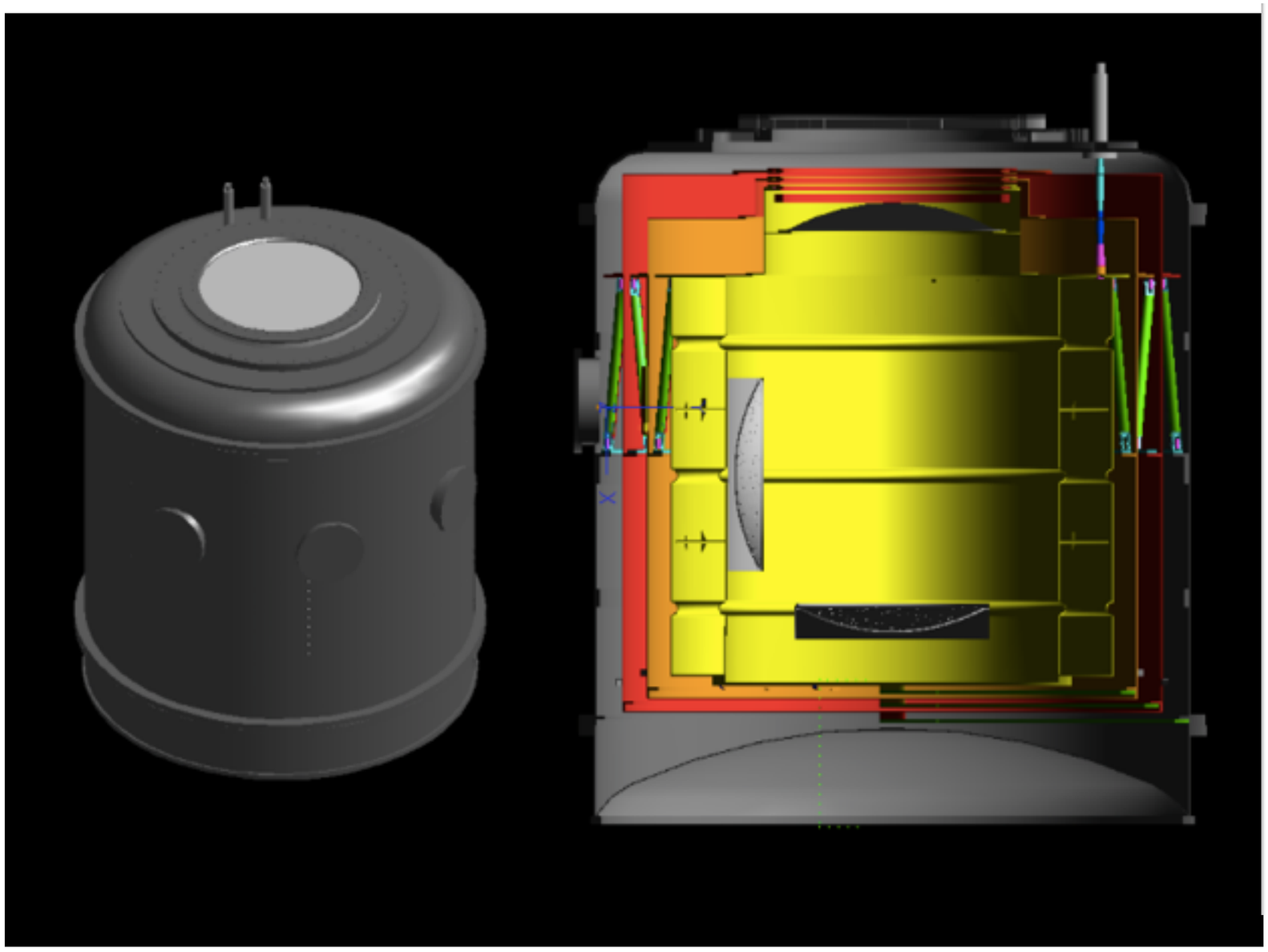


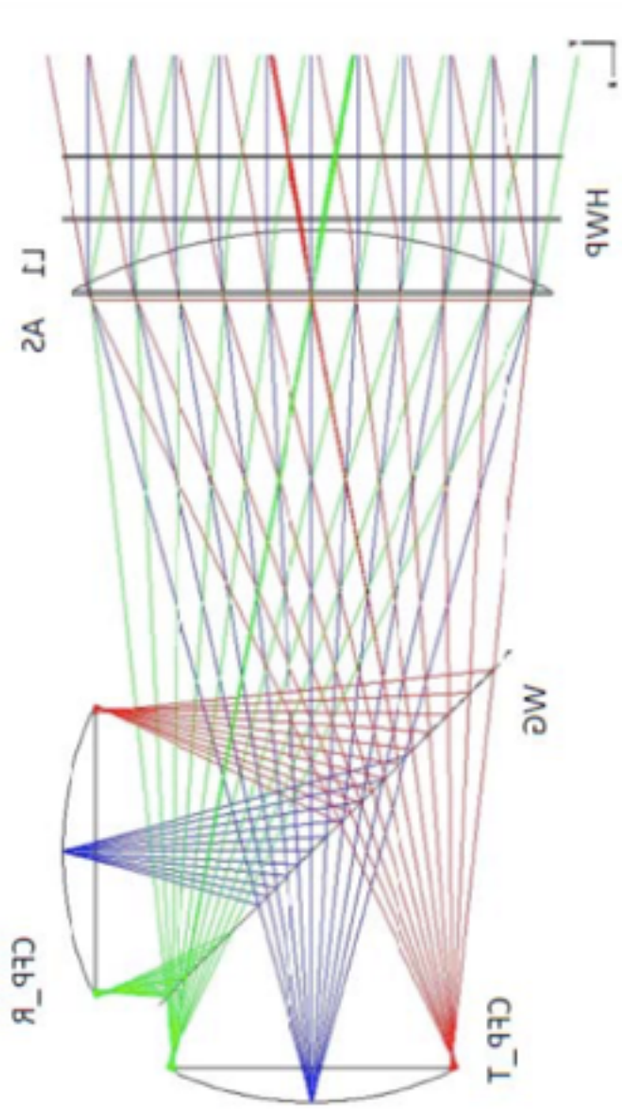
- Genova : Bolometri, LNA, SQUID, Integrazione sul piano focale
- Pisa : Elettronica Frequency Division Multiplexing, Risuonatori
- Roma1: Instrument Design, Criostato, Ottiche, integrazione e test,
- Roma2 : Integrazione e test di pre-volo
- Ferrara : Analisi dati

- Volo stratosferico a 30Km: P=3mbar, T=-80C
- Volo notturno: uso batterie termostatate per autonomia di 3 settimane (c.a 0.7ton)
- Volo tra 70-80° N
- Pallone 800.000 m3 He gas
- ASI responsabile del lancio e volo
- Gruppo di lavoro coordinato da E.Flamini per utilizzo expertise di altre agenzie alle Svalbard con personale italiano in training
- La data di lancio di gennaio 2016 e spostata a dicembre 2016 - gennaio 2017

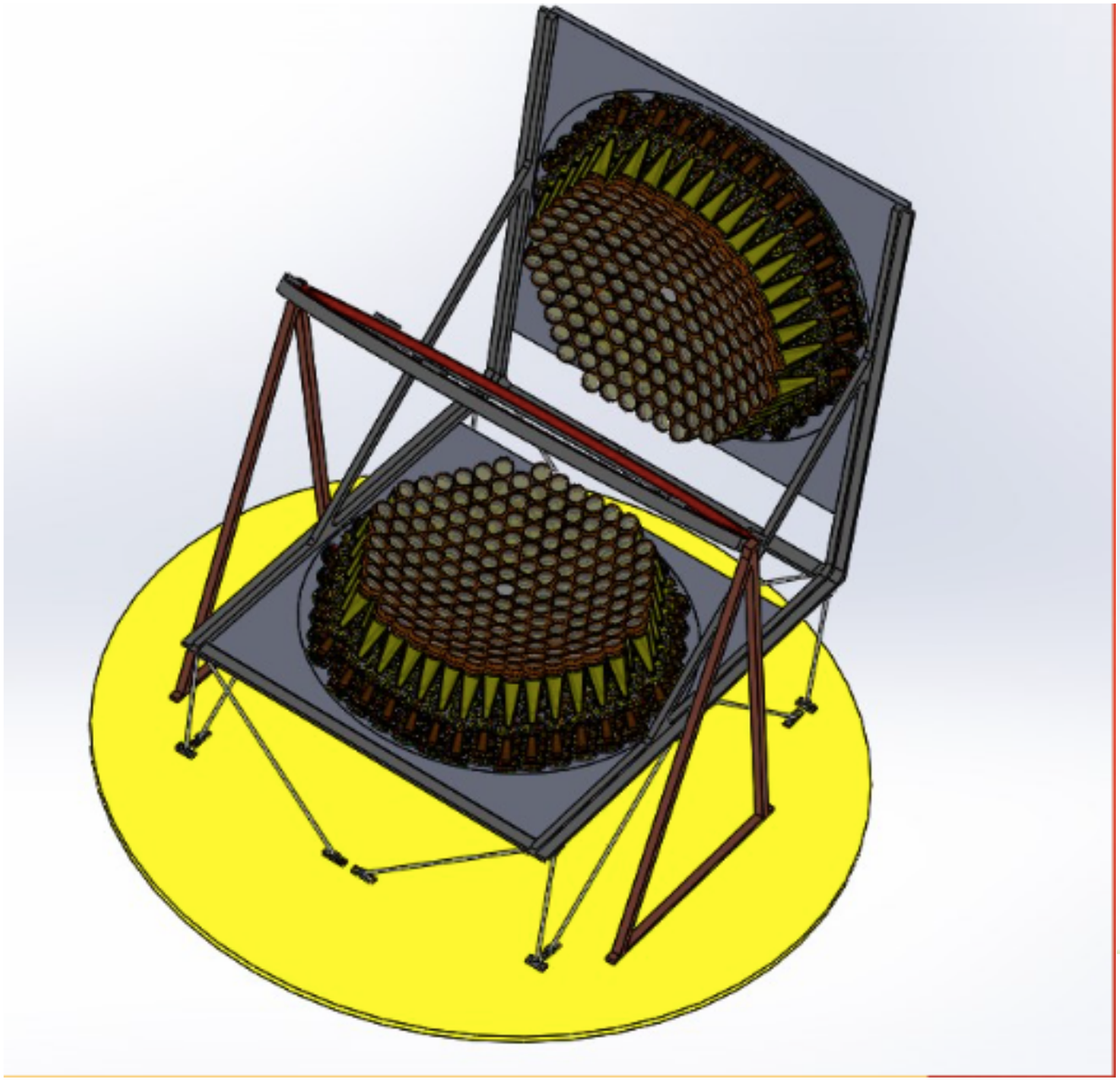


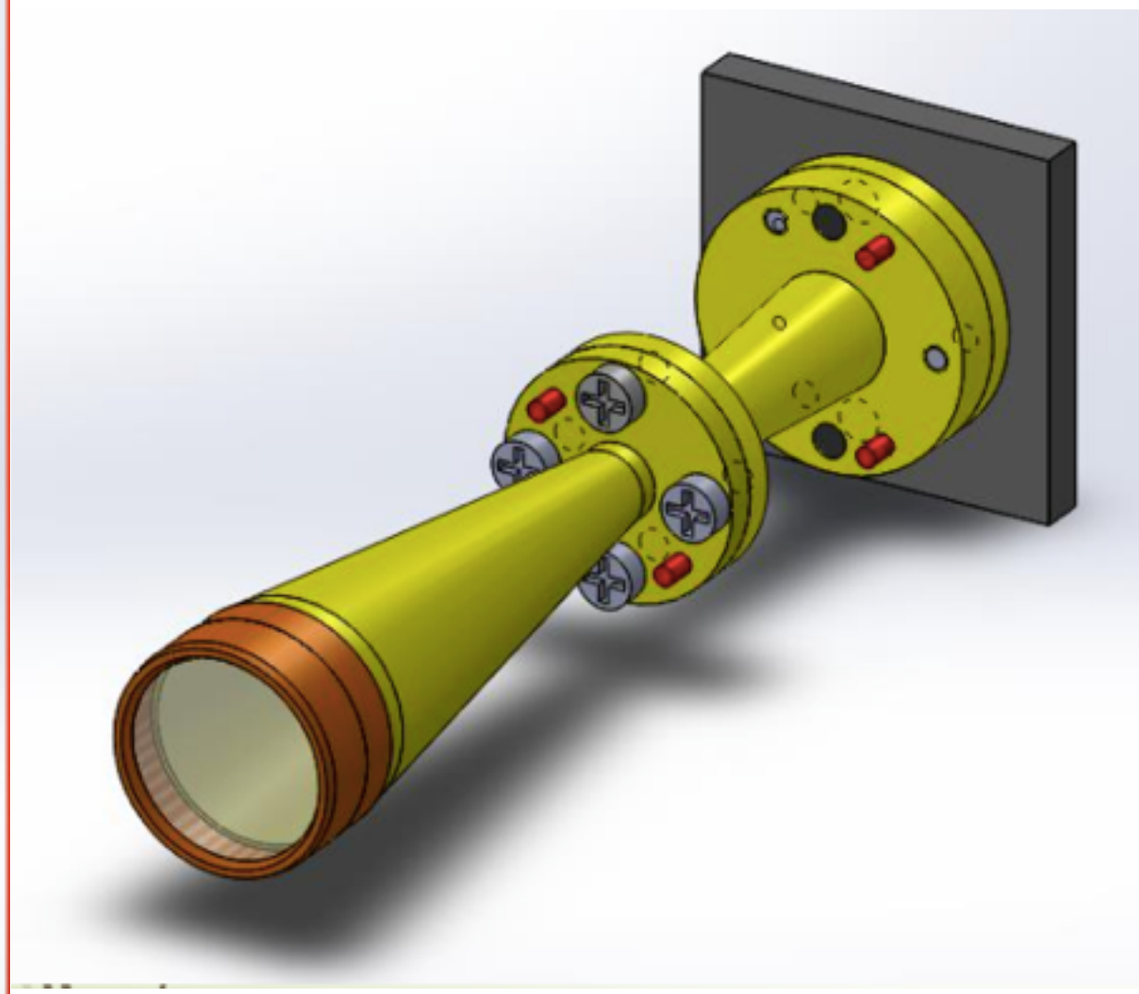
LSPE ottica



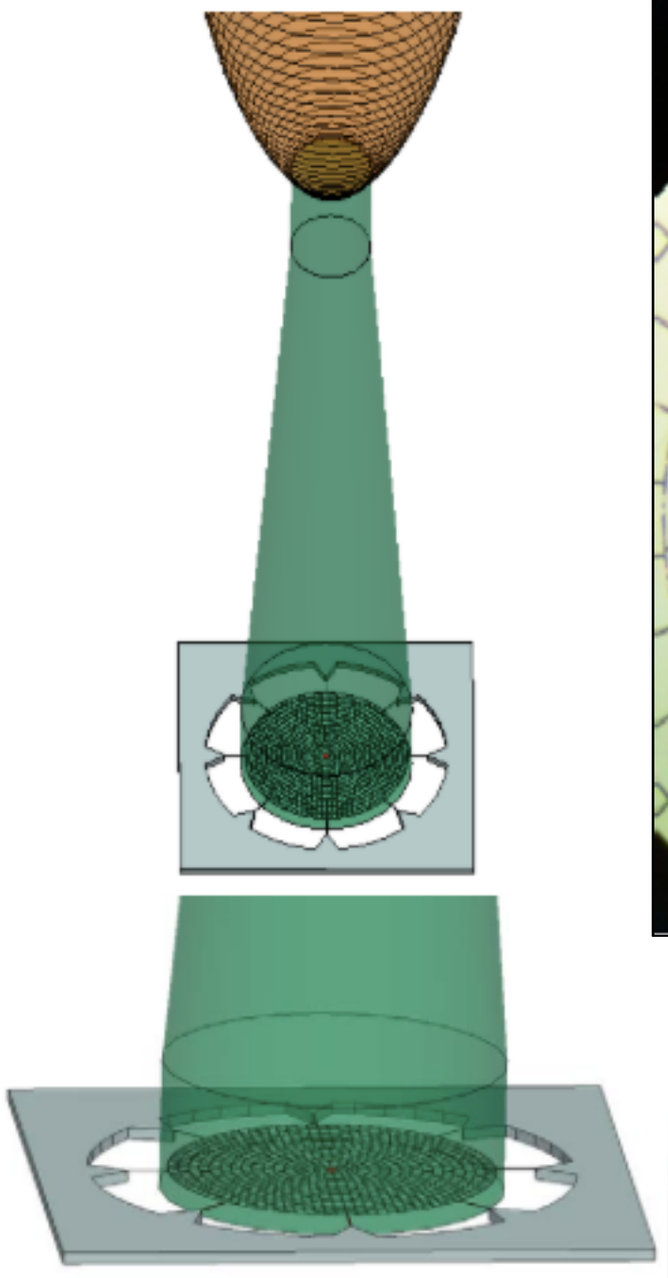


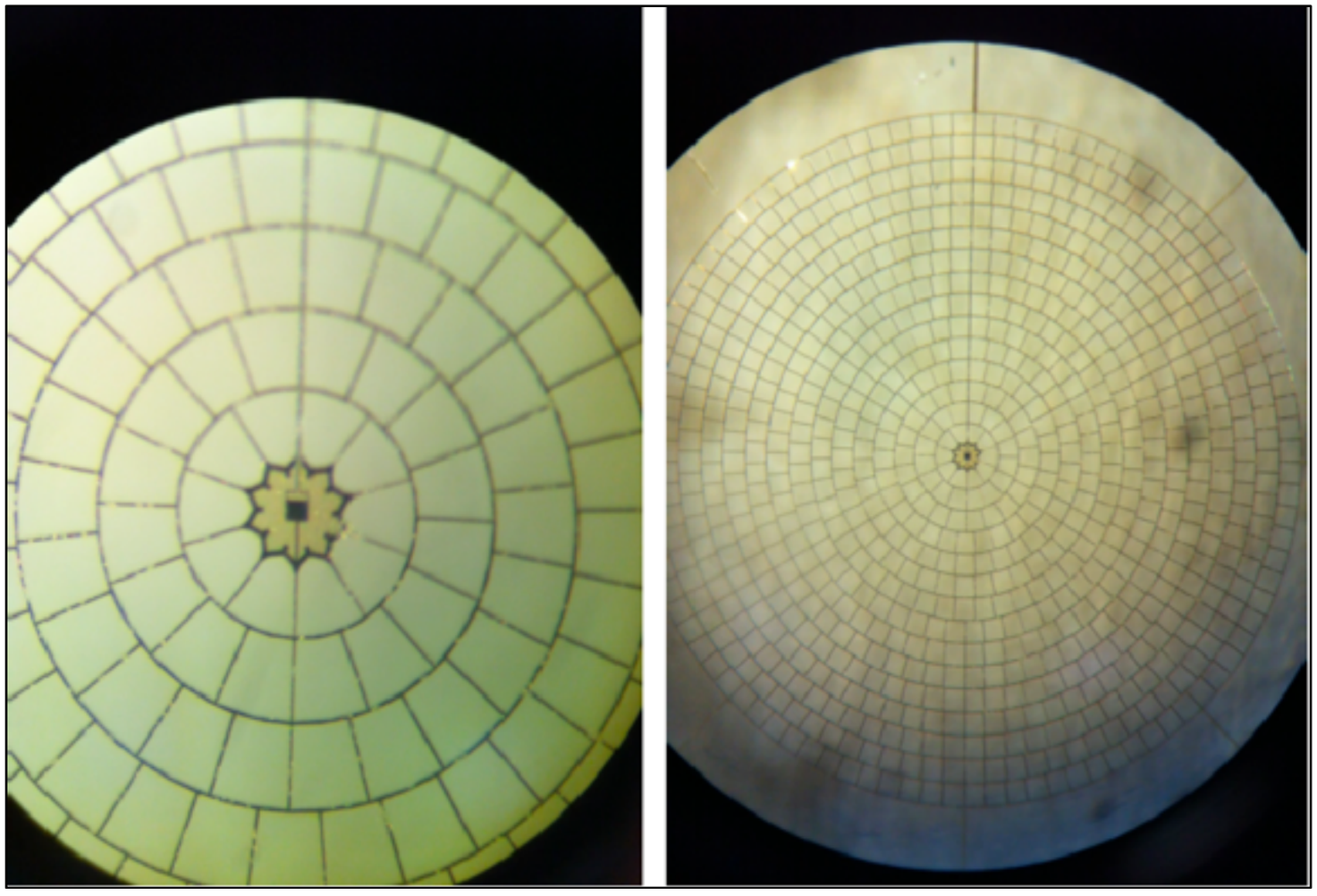
Resp: Roma1

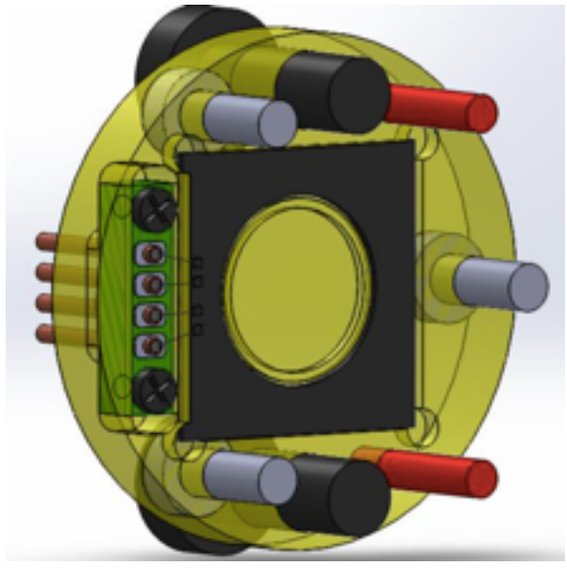




Resp: Roma1



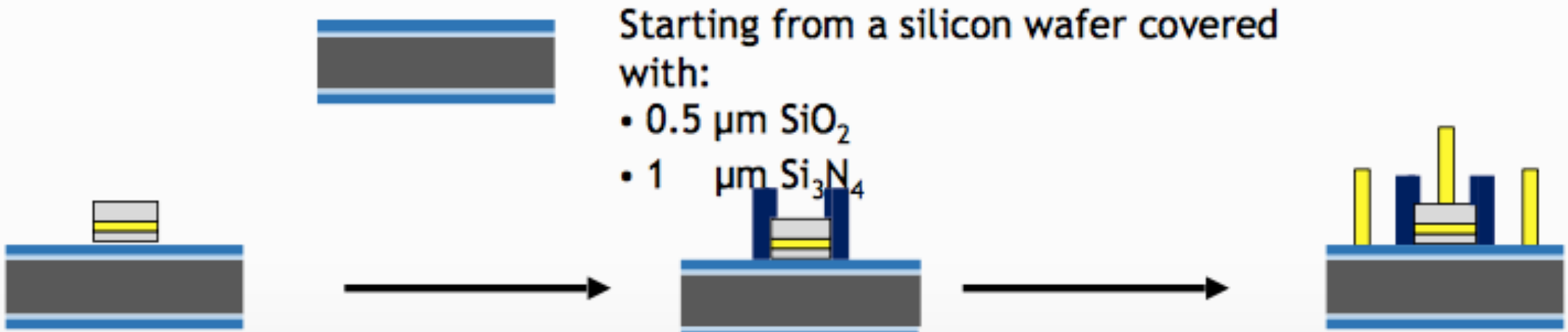




Resp: Genova

Fabrication Process 1: metals deposition

Negative Photolithography, e-beam metal evaporation, Lift-off process

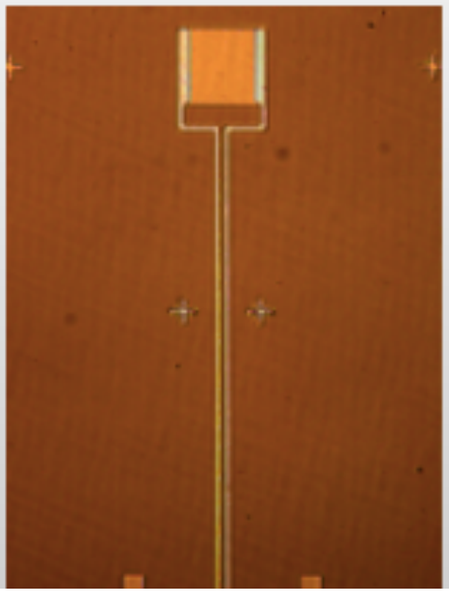


Starting from a silicon wafer covered with:

- 0.5 μm SiO_2
- 1 μm Si_3N_4

TES:
Ti 5 nm
Au 4 nm
Ti 38 nm

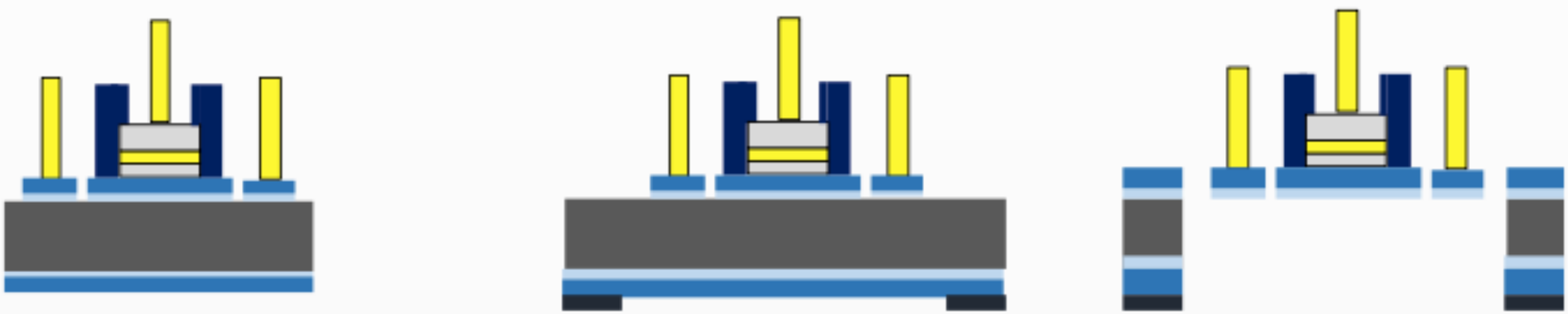
TES wiring:
Al or Ti/Al/Ti multilayer



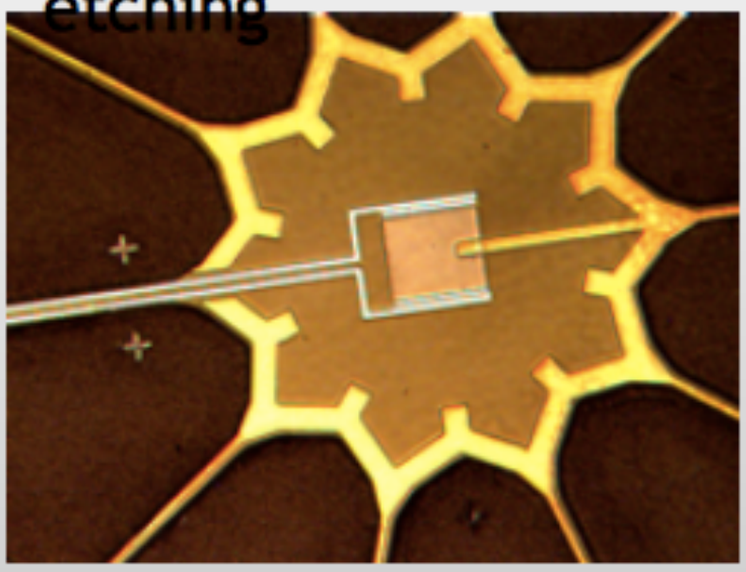
Au absorber deposition (a Ti sticking layer is ne

Fabrication Process 2: Etching

Reactive Ion Etching used to cut silicon and silicon nitride



Positive photolithography and RIE $CF_4 + O_2$ etching

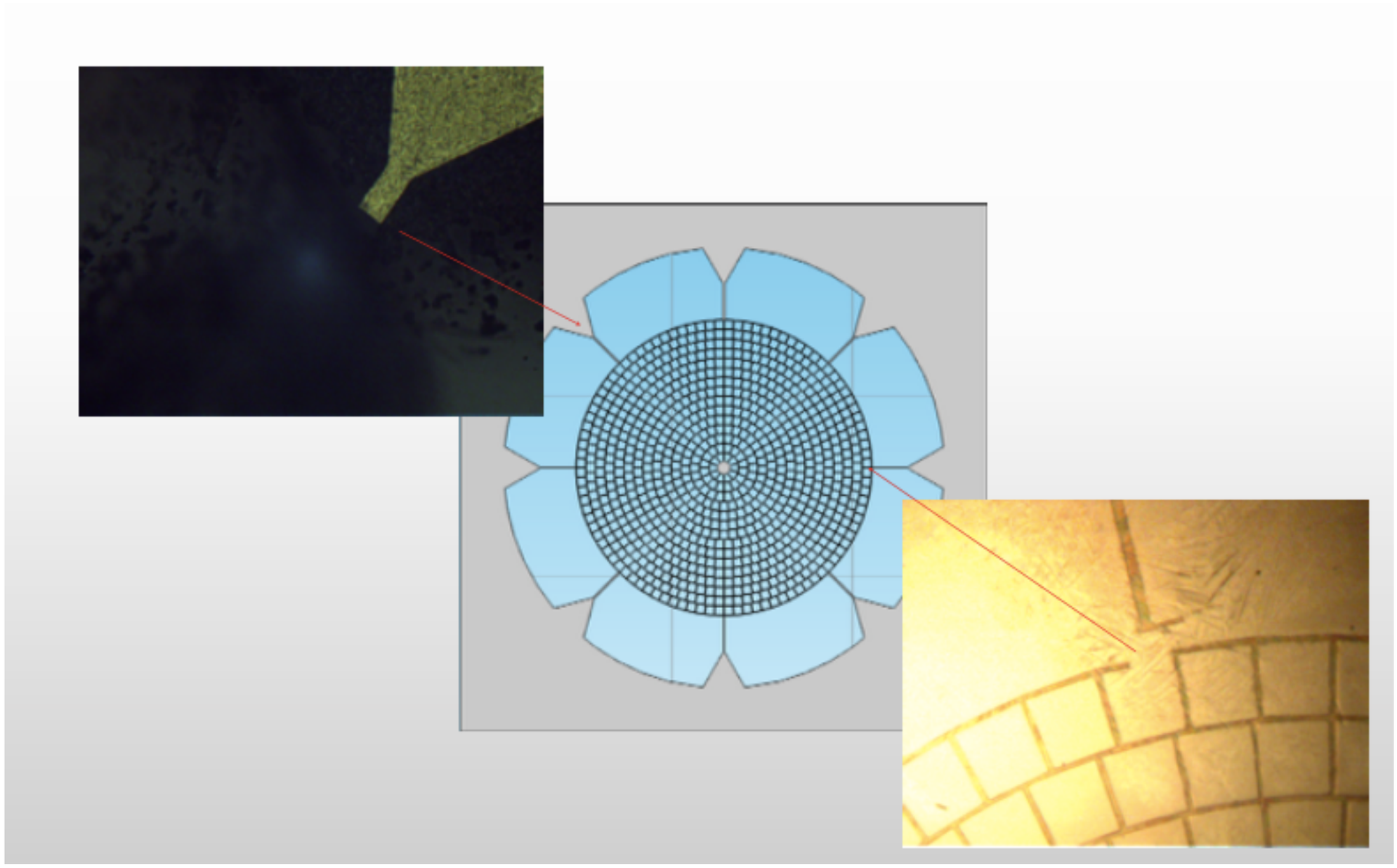


deposition of Aluminum hard mask on backside with lift-off process

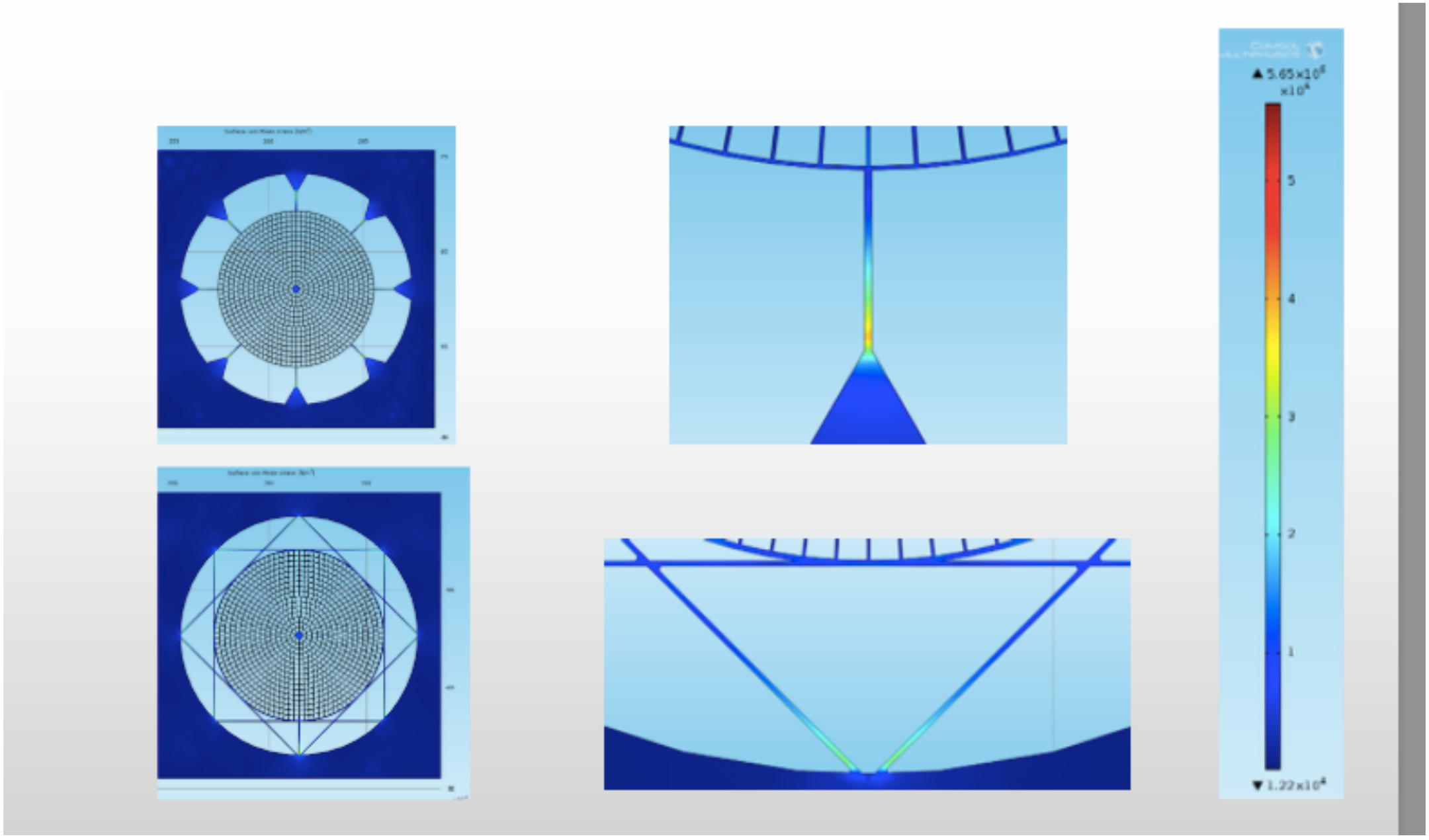
RIE back wafer etching with $SF_6 + O_2$ and suspension of spider web structure

Endpoint detection by optical plasma analysis

- Con lanci nel gennai 2017 -> tempo per ottimizzare la produzione dei bolometri

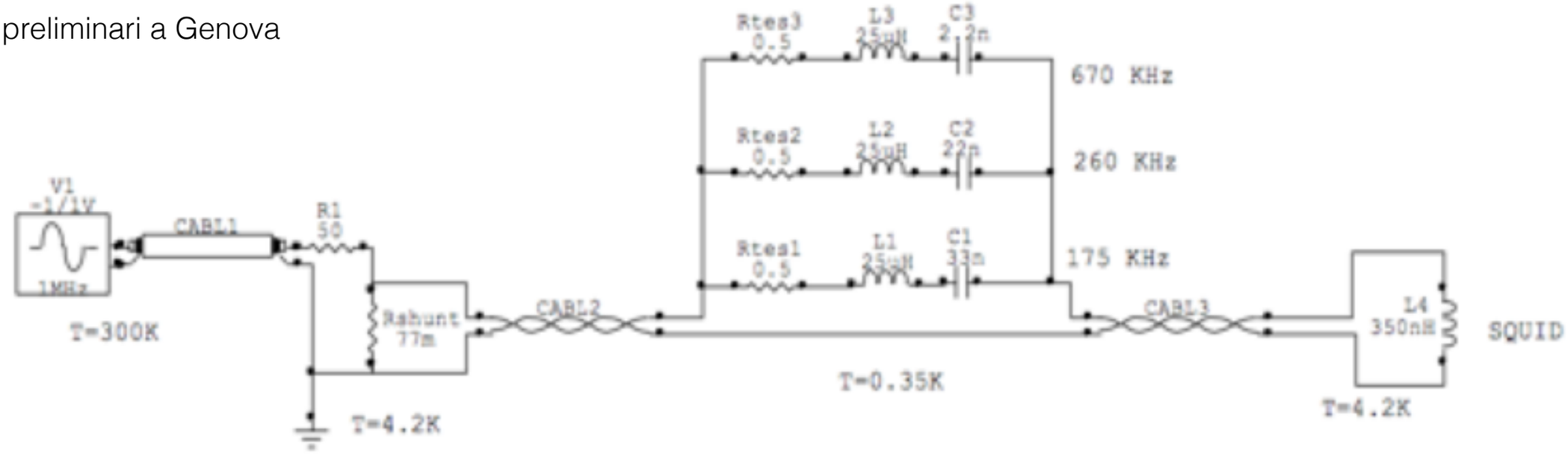


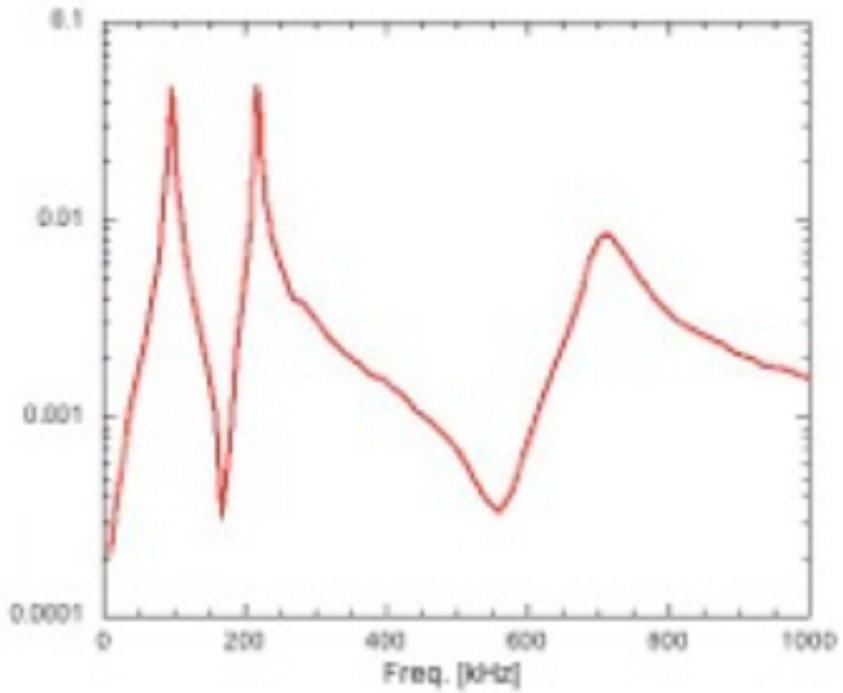
- nuova geometria delle sospensioni per ridurre lo stress e le deviazioni dalla planarita’

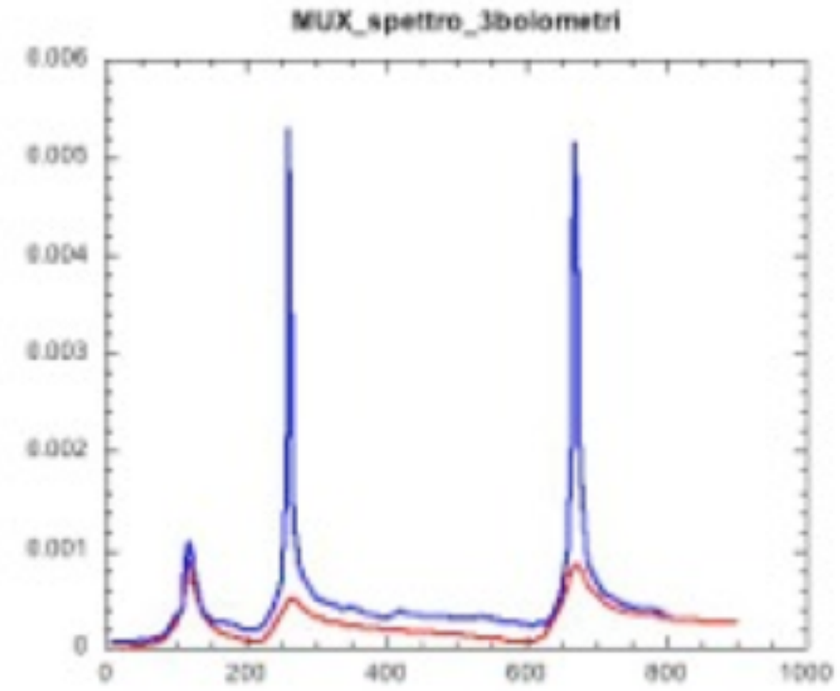


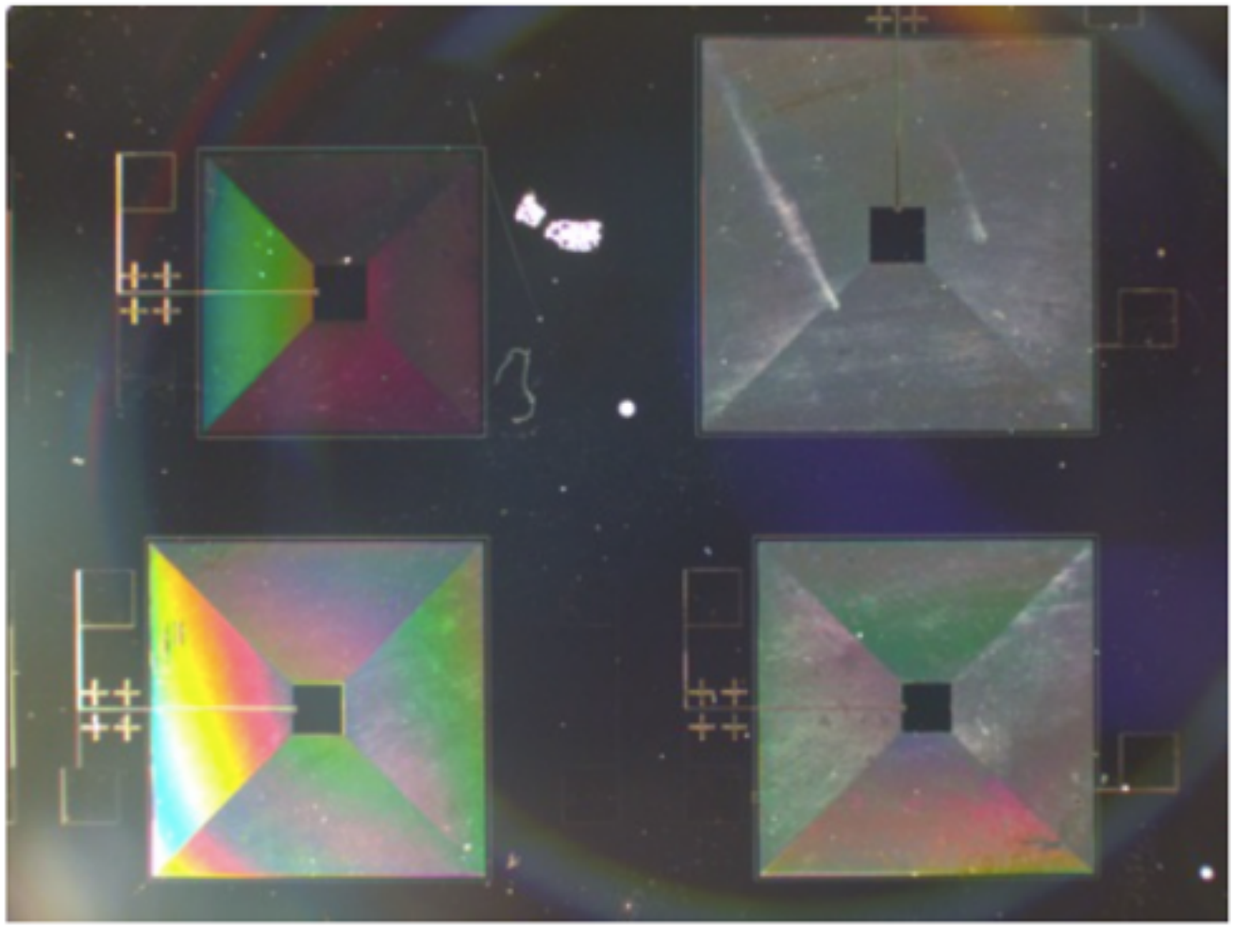
frequency division multiplexing 16 canali

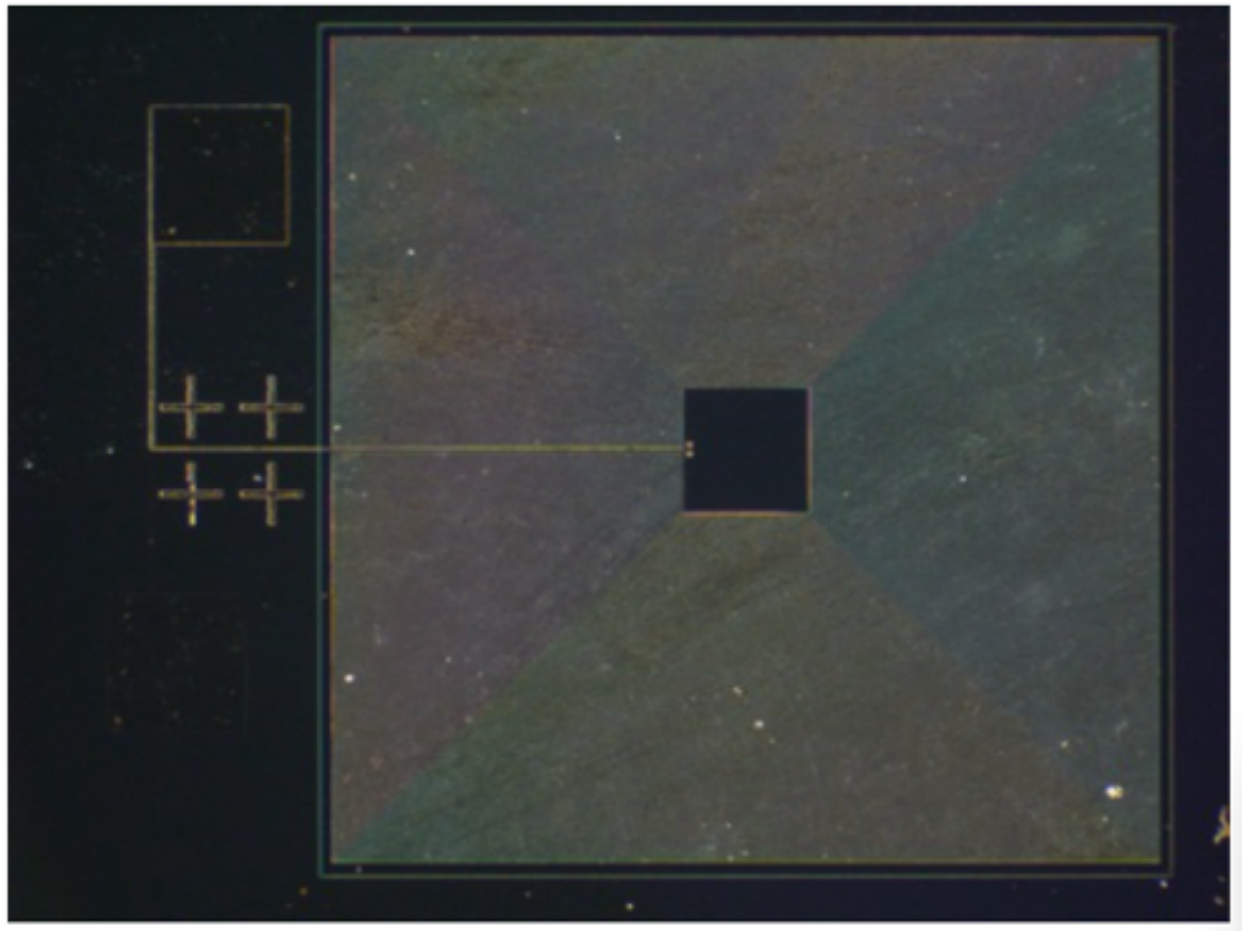
Test preliminari a Genova





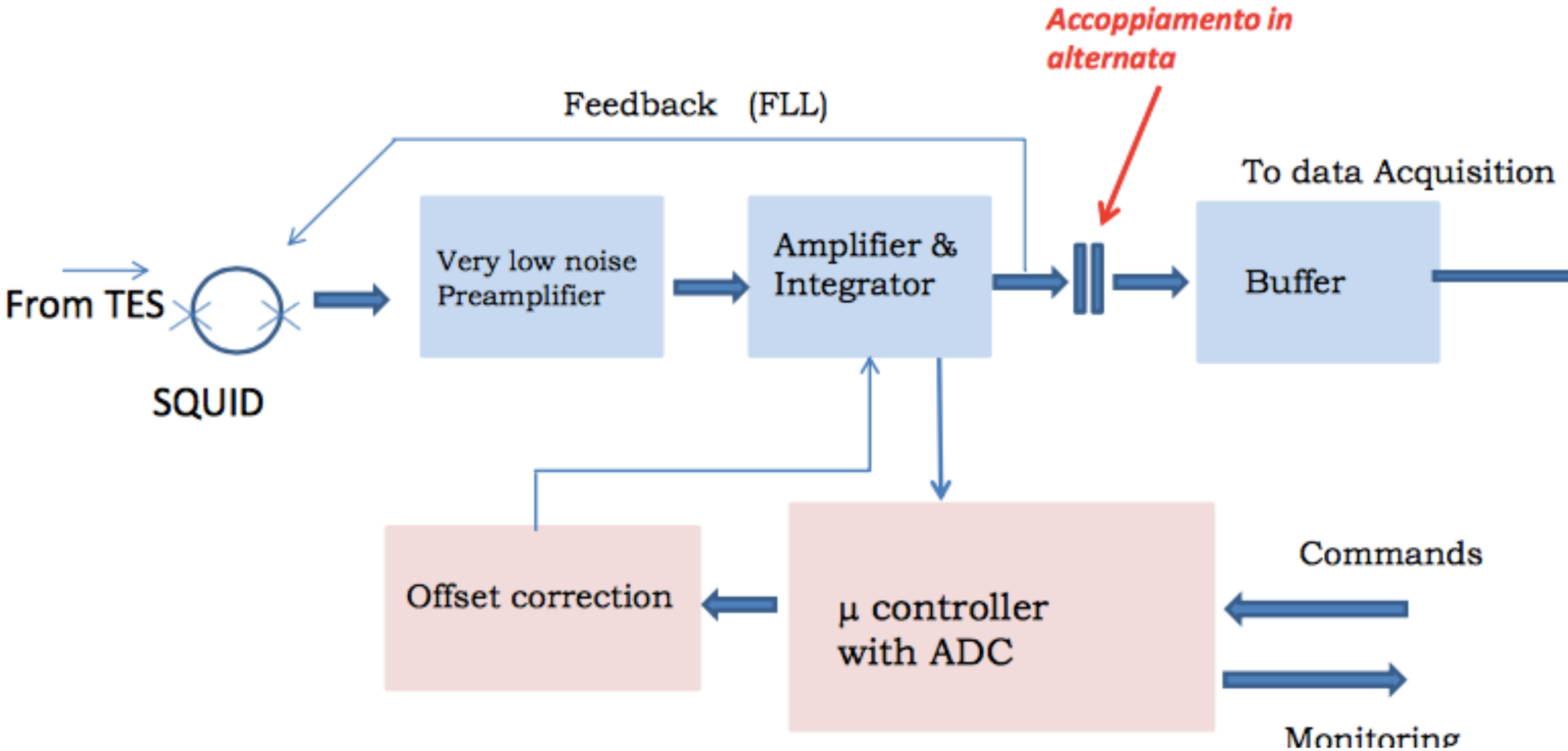






Resp: Genova-Pisa

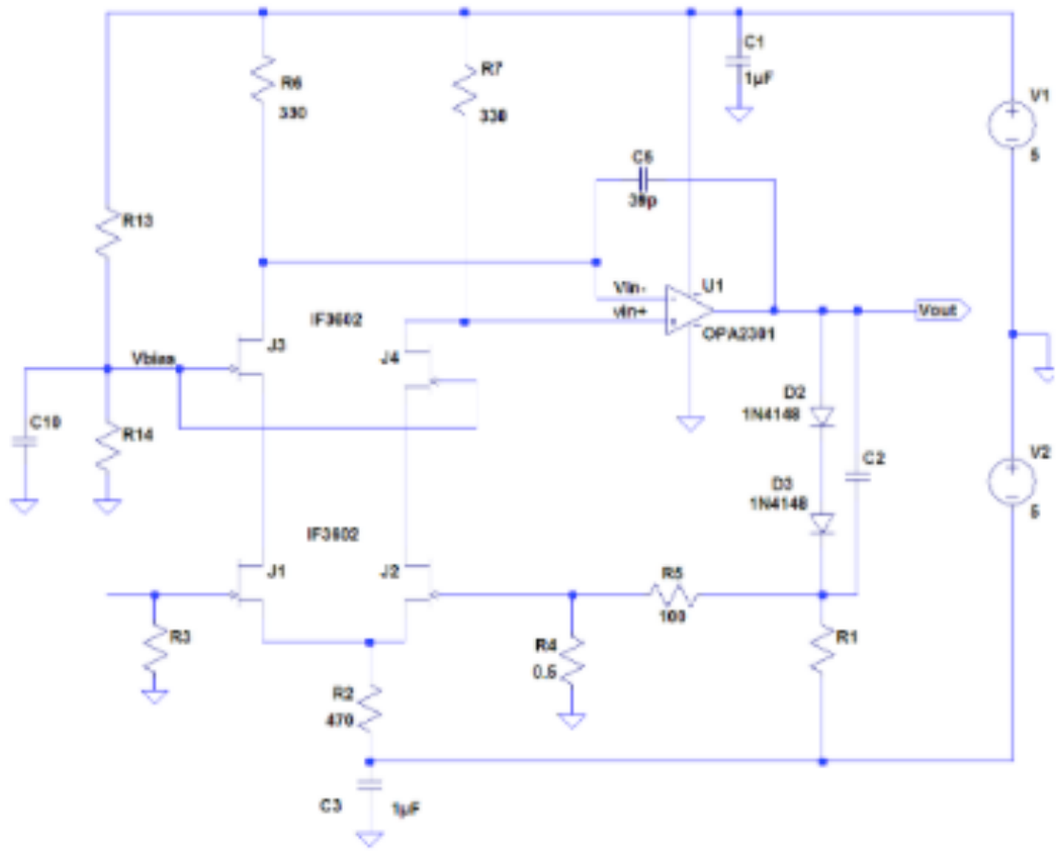
General structure of our system:



Resp: Genova

Preamplifier with FET input stage

- High gain G=200
- Wide bandwidth (>2MHz @ 3 dB)
- Low Noise (0.6-0.7 nV/√Hz)
  (equivalente ad una resistenza di 25 Ω)



• Differential input amplifier with cascode configuration to increase bandwidth and lower input capacitance (Miller effect)

• CMOS second stage with moderate low noise (3 nV/√Hz nominal)

• Output offset voltage must be zeroed in the second stage.

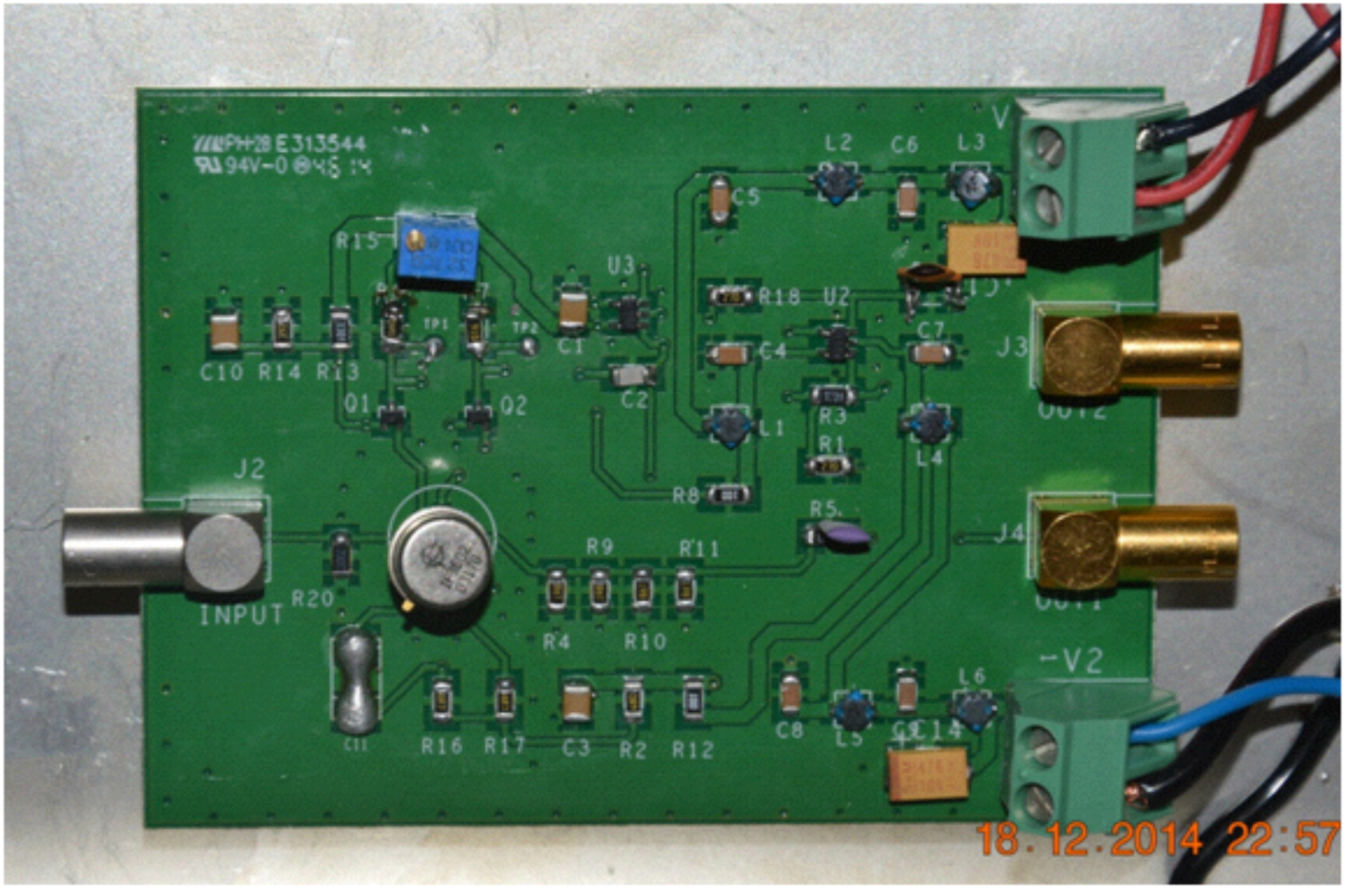
• It must stay reasonably close to the squid: cable inductance and input capacitance can resonate in the middle of our useful bandwidth.

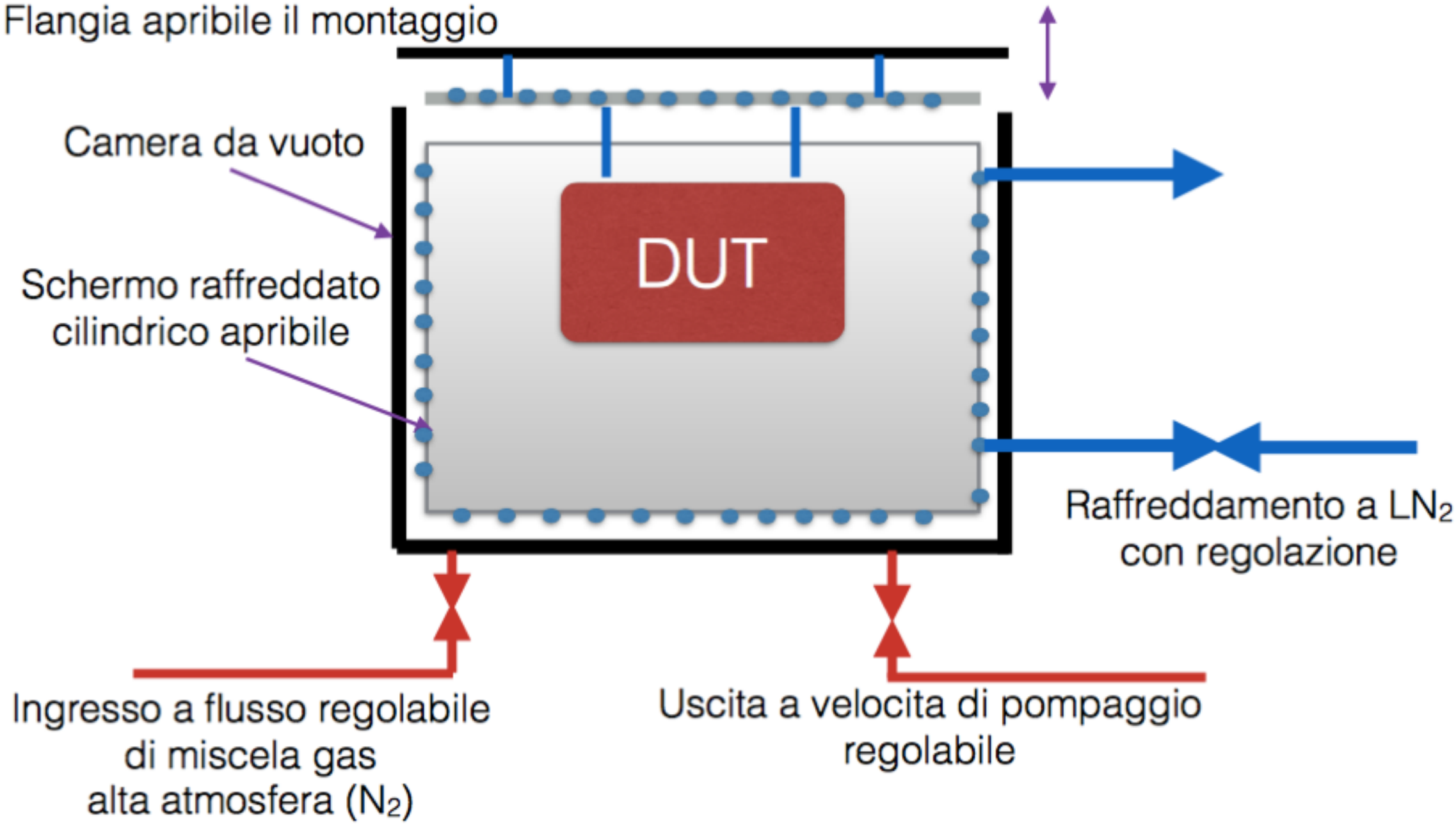
• Tested @ -100 C

• High input capacitance (~500 pF)

Resp: Genova

- J-FET-CMOS cold LNA (-100 C -> temp. ambiente) F.Fontanelli




Flangia apribile il montaggio
Camera da vuoto
Schermo raffreddato
cilindrico apribile
DUT
Raffreddamento a LN2
con regolazione
Ingresso a flusso regolabile
di miscela gas
alta atmosfera (N2)
Uscita a velocita di pompaggio
regolabile

Resp: Genova

Anagrafica

Anagrafica LSPE

	LSPE
Gatti F	50
Biasotti M	40
Corsini D	80
F.Fontanelli	30
Boragno	40
totali FTE	2.4

Contributi significativi

M Biasotti : Bolometri
L. Parodi : Criogenia, Camera Climatica
F. Fontanelli: LNA
D. Grosso: Camera Climatica

Impegni servizi

EXP	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
LSPE	Off. Mec.: Vacuum & Bolometer test support + integration @ LNF + Svalbard 3 mu										
Strutt Timing Counter Commissioning	Dis. Mec: Vacuum & Bolometer test support + integration @ LNF 3 mu										