

SCHOOL OF ADVANCED STUDIES Scuola Universitaria Superiore



Update of HERD GSSI activities

Felicia Barbato – on behalf of GSSI group

PSD meeting - 7/05/2021

HERD PSD activity summary





Effective photosensitive area	3x3 mm
Number of pixels	5520
Pixel size	40 µm
Peak sensitivity wavelength (typ.)	420 nm
Dark count (typ.)	<900 kcps
PDE	43%
Gain (typ.)	3.6×10 ⁶

	BC-404
Radiation Detected	
<100keV X-rays	
100keV to 5MeV gamma rays	
>5MeV gamma rays	
Fast neutrons	
Alphas, betas	Х
Charged particles,cosmic rays, muons, protons, etc.	
Principal Uses/Applications	fast counting
Scintillation Properties	
Light Output, %Anthracene	68
Rise Time, ns	0.7
Decay Time (ns)	1.8
Pulse Width, FWHM, ns	2.2
Wavelength of Max. Emission, nm	408
Light Attenuation Length, cm*	140
Bulk Light Attenuation Length, cm	160













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The charge is almost 1/2 if the trigger is on the far side

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Lab activities: test on DAQ



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PSD bar prototype for 2021 beam test



PSD bar prototype for 2021 beam test







2 Layers x-y measurements

2) Staggered trapezoidal bars

Simulation activities: hermeticity



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Trapezoidal bars increase hermeticity and move the primary loss fraction at big angles

Preliminary mechanical design for 2021 beam test

Agreement between GSSI and UniNA

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Preliminary mechanical design for 2021 beam test





Requires x motion to move from Pavia to Bari tiles

HERD 9th International WORKSHOP - 23/02/2021

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Preliminary mechanical design for flight model





Preliminary mechanical design for flight model



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Preliminary mechanical design for flight model



Very simple mechanics

More complicated structure

A very first evaluation of the solutions foresees easier vibration dumping for the bars

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Compare the response of trapezoidal and rectangular bars

- □ Test the Saint Gobain bar 5x75x0.5 cm3
- □ Compare frontend solutions (wired-or, op-amp)
- □ Realize the PCBs
- □ Start the end-cup production
- □ Prototype assembling (end of June)

□ Also working on simulations in HERD software framework: tiles started -> bars starting

15