

Photo emission microscope PHEMOS-1000 ONPY-PEM

Extended resources for Failure Analysis (FA) in ONPY

Subject:

This document outlines analytical possibilities of the front and backside photoemission microscope PHEMOS-1000 in OPNY2

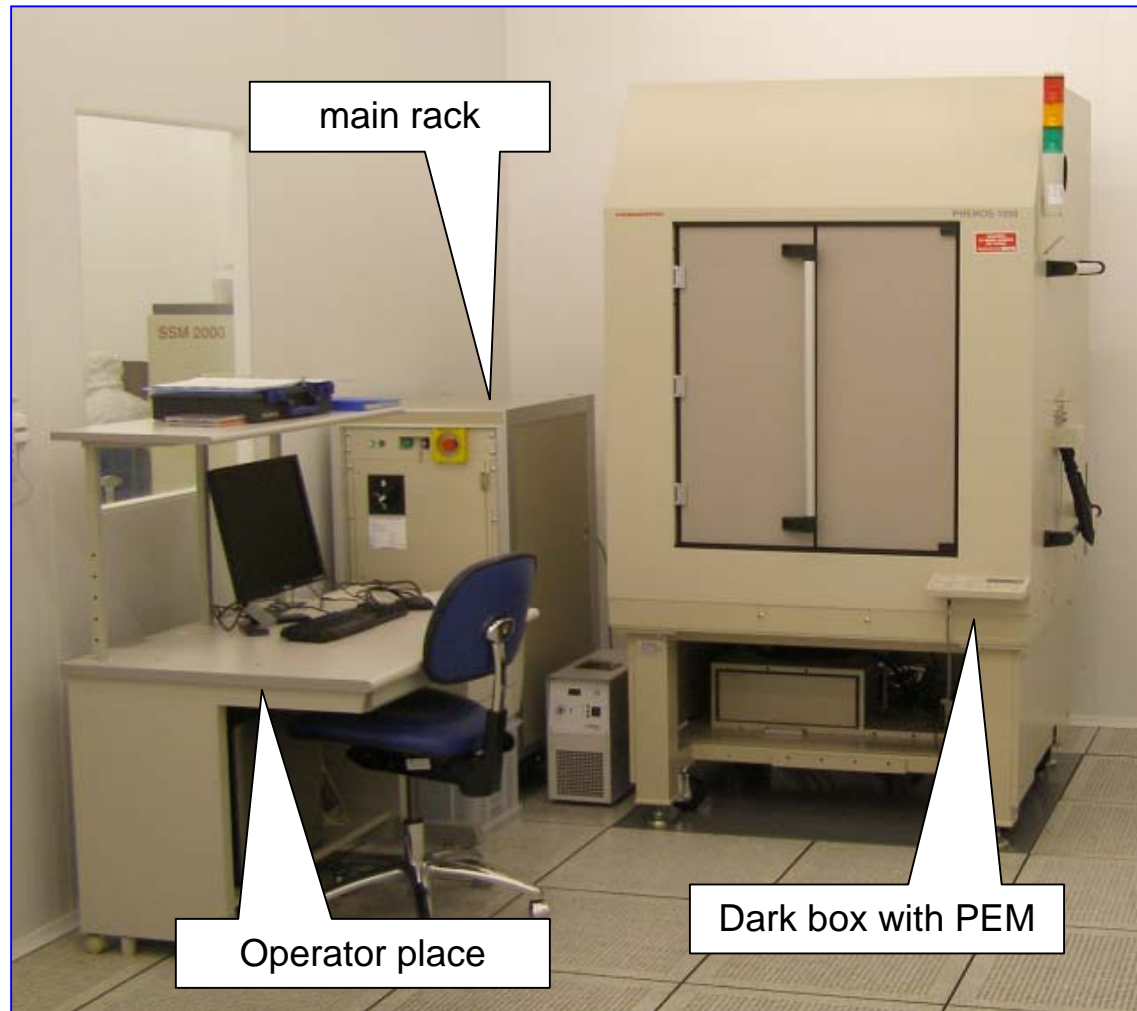
Content:

This system was purchased from Hamamtsu Japan and installed in WW11

Reference documents

N/A

Photoemission Microscope PHEMOS-1000 (outline)



General:

Dual stand photoemission microscope with optional Laser scanning

Optical system:

PEM: cooled CCD camera Hamamtsu (1024x1024, pettier cooled, NIR range appropriate for front and backside photoemission)

Presented Objectives:

- 0.8x Macro objective
- 5x (Aperture=0.14, WD ~ 35 mm)
- 20x (Aperture=0.40)
- 100x NIR * (0.50, WD ~ 12 mm)

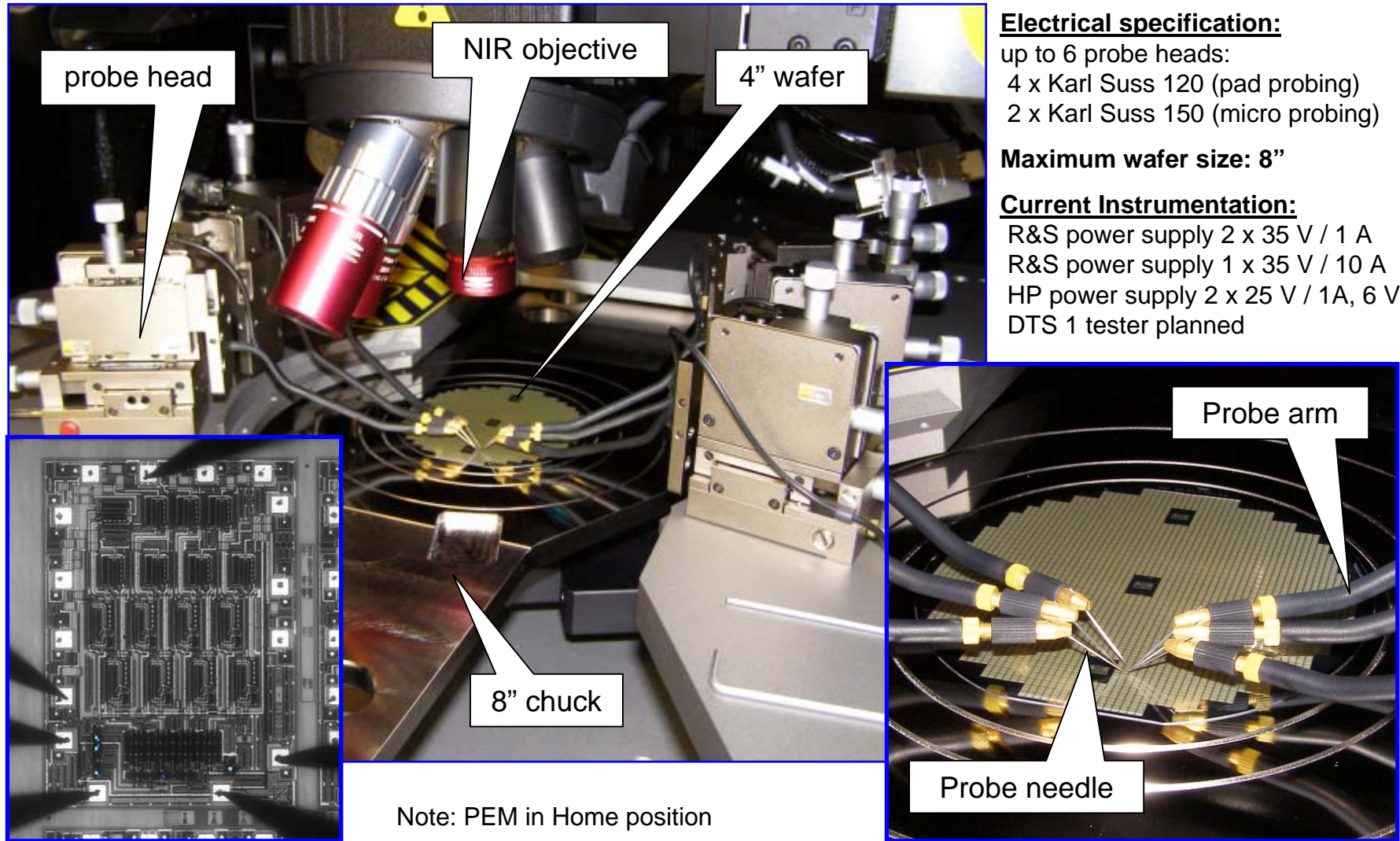
Prober Karl Suss PM8

- Manual prober for 4-8" chucks
- dual plate (front and backside probing)
- Theta adjustment
- 4 x PH120 probe head
- 2 x PH150 precise probe head
- backside CCD camera (with 0.8x, 1,5x, 3x magnification)
- microprobe opportunity

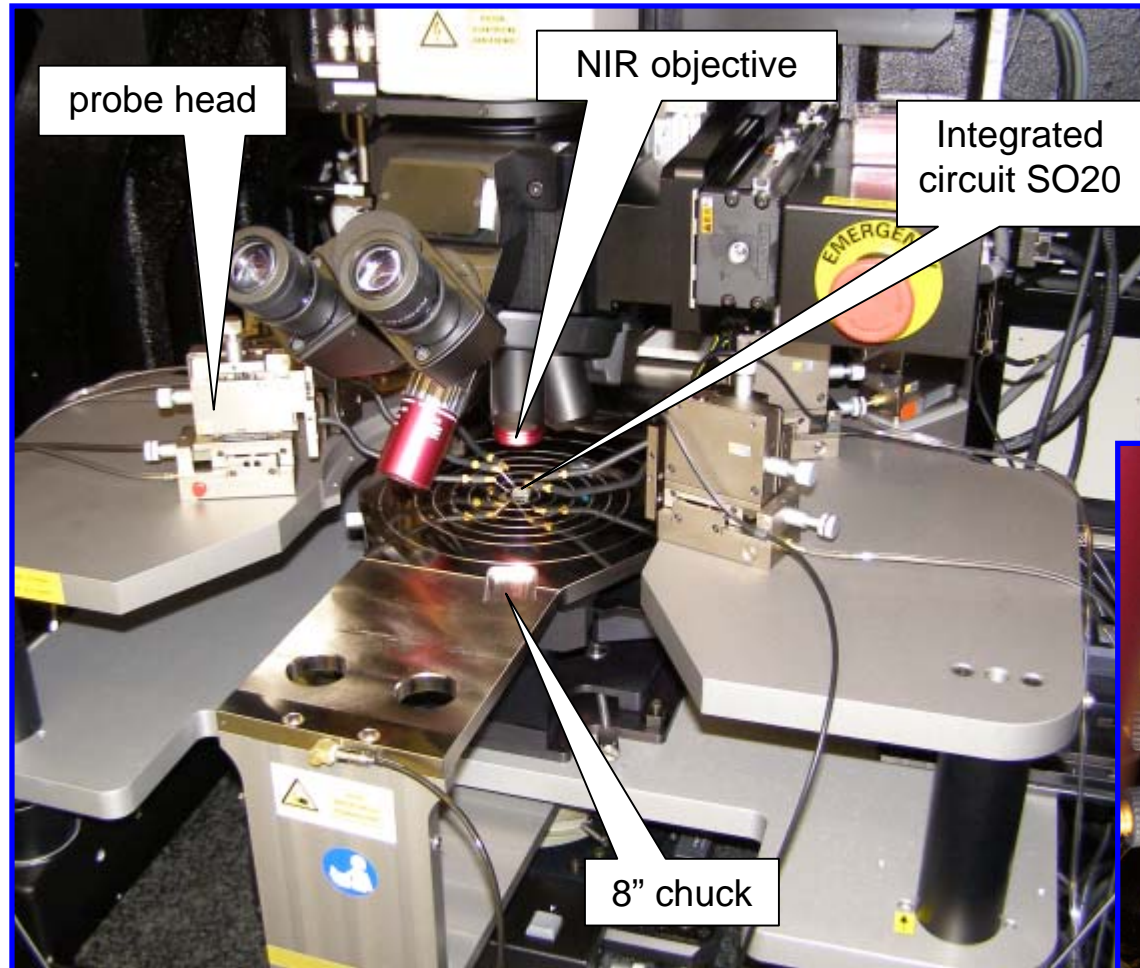
Current Instrumentation:

- R&S power supply 2 x 35 V / 1 A
- R&S power supply 1 x 35 V / 10 A
- HP power supply 2 x 25 V / 1A, 6 V

Front side probing and photoemission with PHEMOS-1000



IC Front side probing and photoemission with PHEMOS-1000



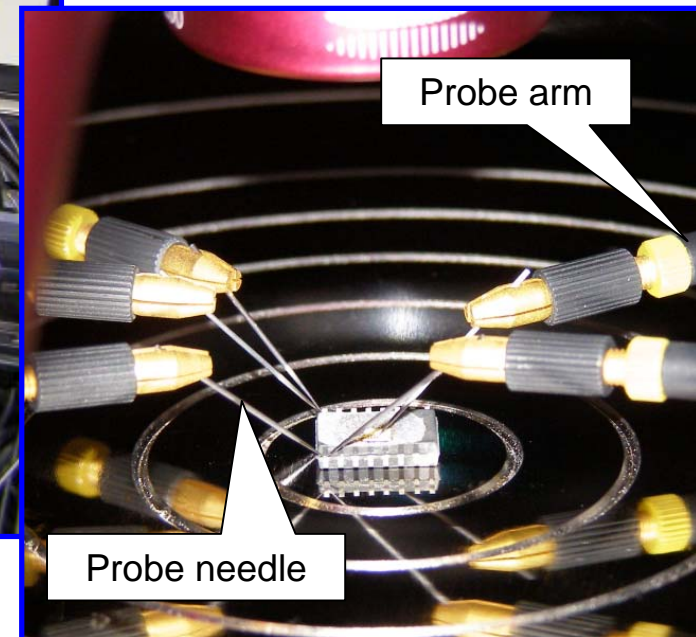
Electrical specification:

up to 6 probe heads:
4 x Karl Suss 120 (pad probing)
2 x Karl Suss 150 (micro probing)

Maximum wafer size: 8"

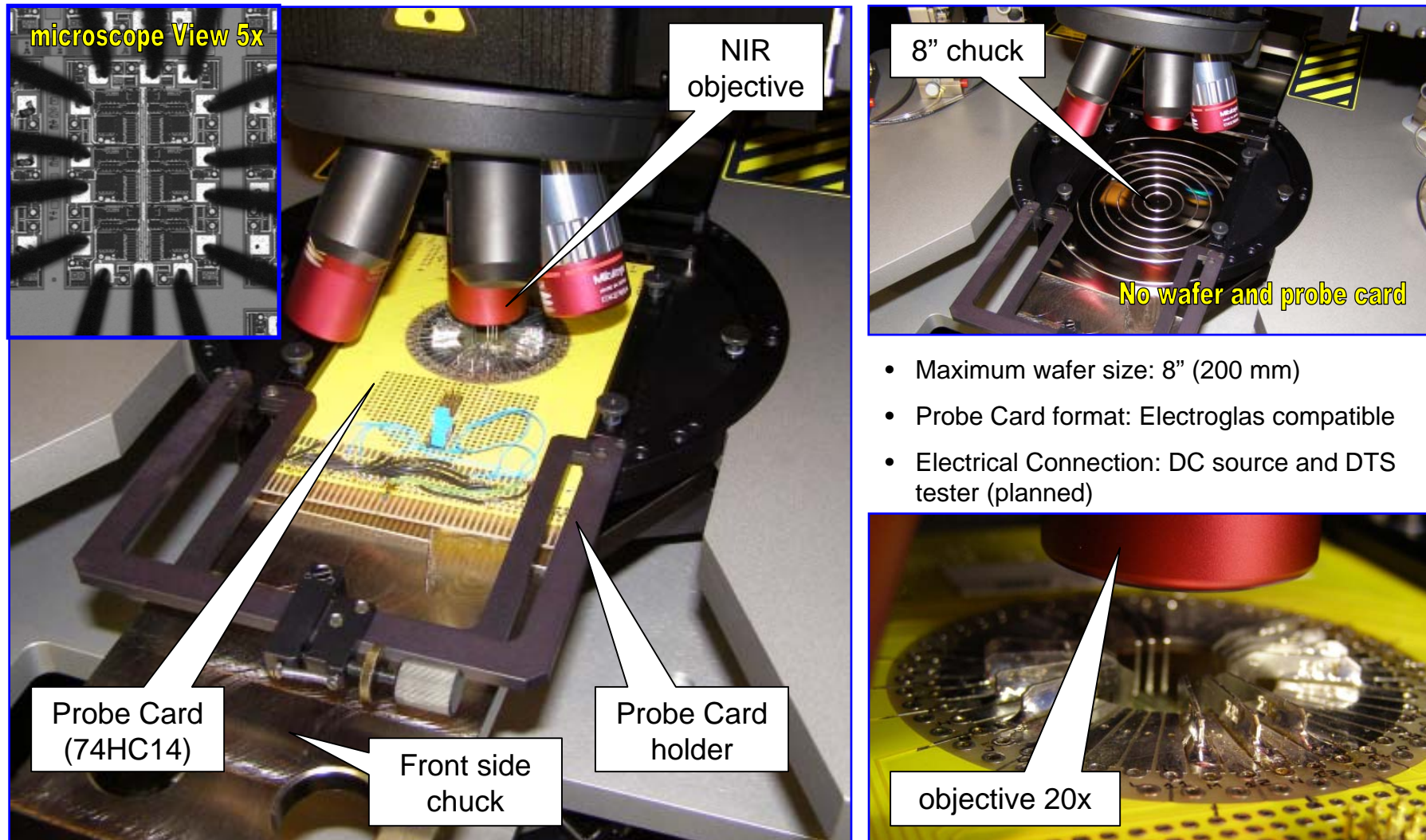
Current Instrumentation:

R&S power supply 2 x 35 V / 1 A
R&S power supply 1 x 35 V / 10 A
HP power supply 2 x 25 V / 1A, 6 V
DTS 1 tester planned

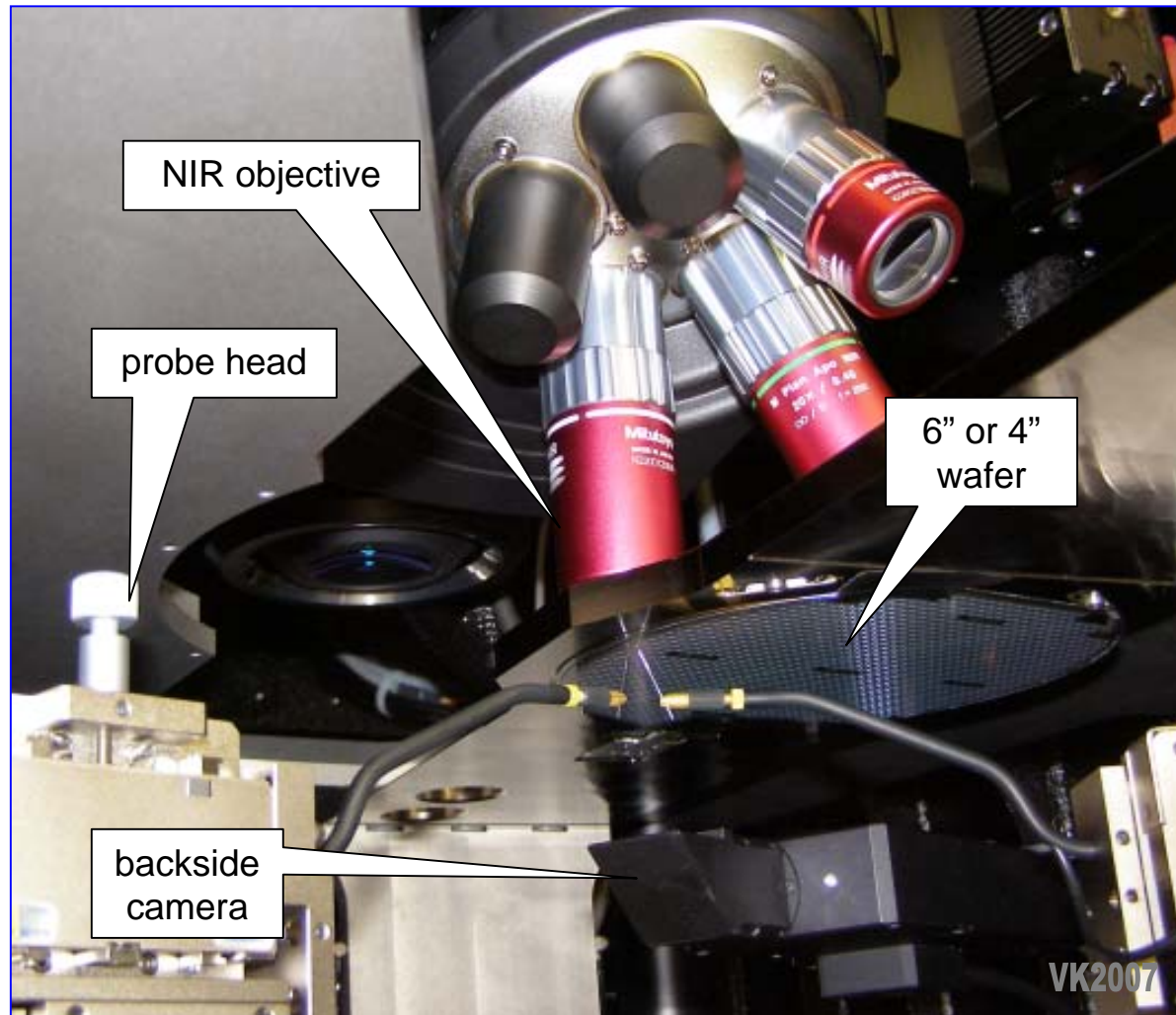


Note: SO20 IC fixed by vacuum

Front side Photoemission with using of Probe Card



Back side probing and photoemission with PHEMOS-1000



Electrical specification:

up to 6 probe heads:
4 x Karl Suss 120 (pad probing)
2 x Karl Suss 150 (micro probing)

Chucks available in ONPY:

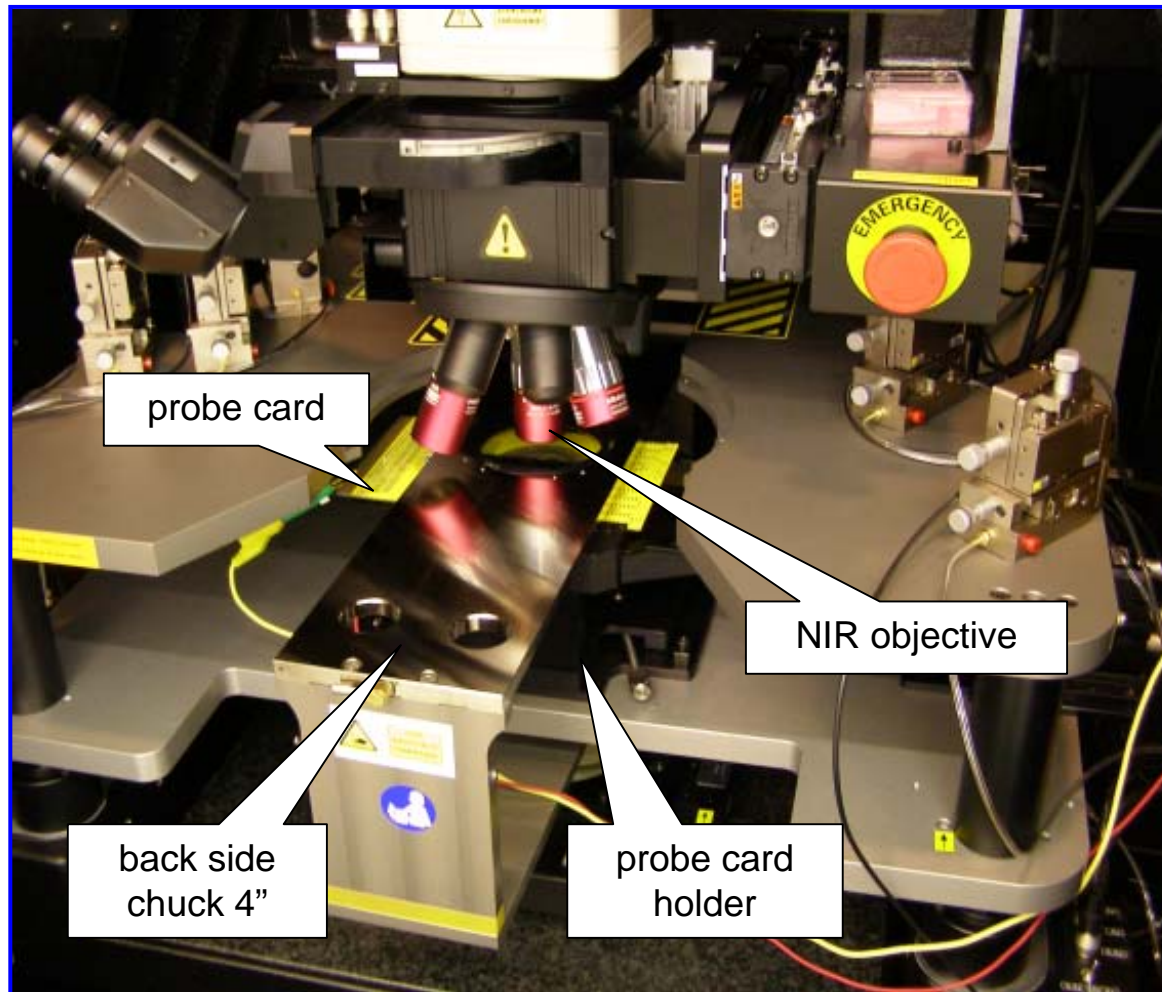
4 inch back side
6 inch back side



Sample - requirements:

100-200 um thickness of the sample
(thinner better)

Back side Photoemission with using of Probe Card



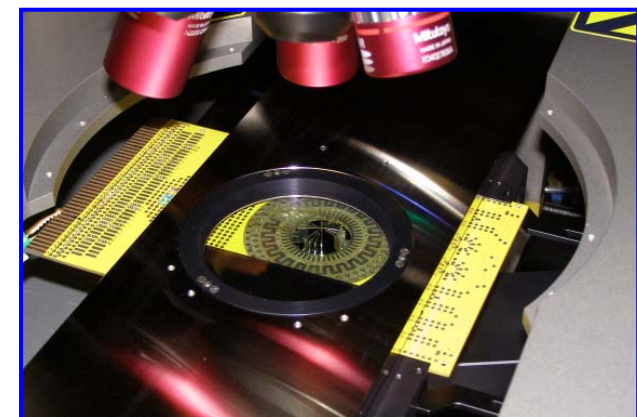
Probe Card format: Electroglas compatible

Electrical Connection:

- DC source
- DTS tester (planned)

Chucks available in ONPY:

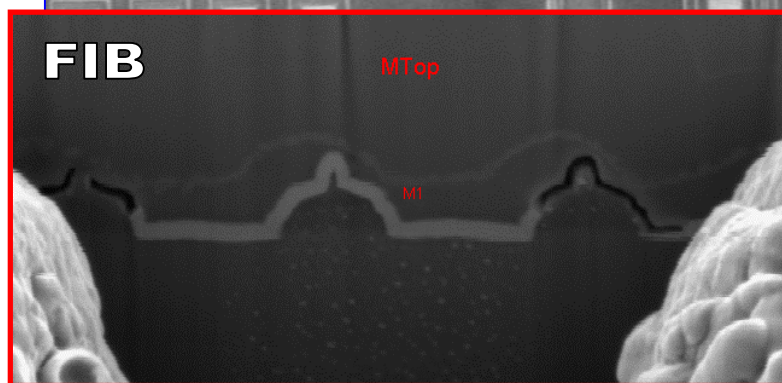
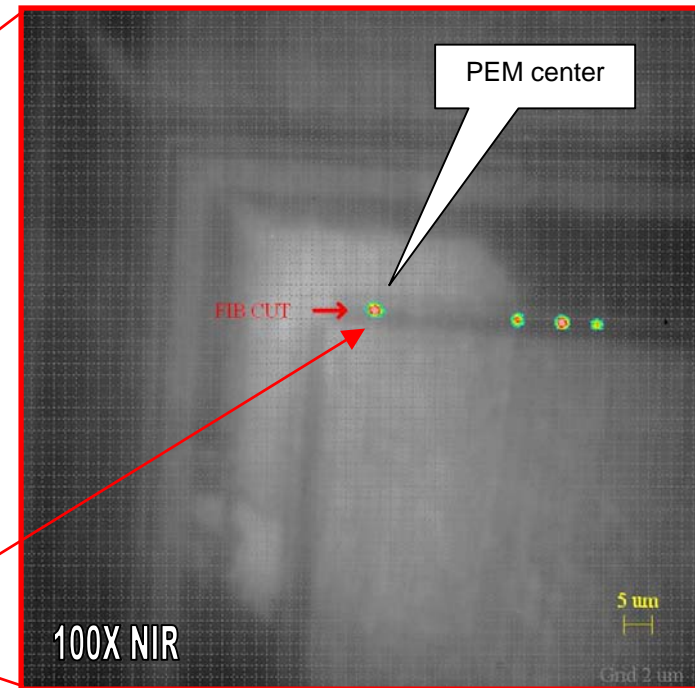
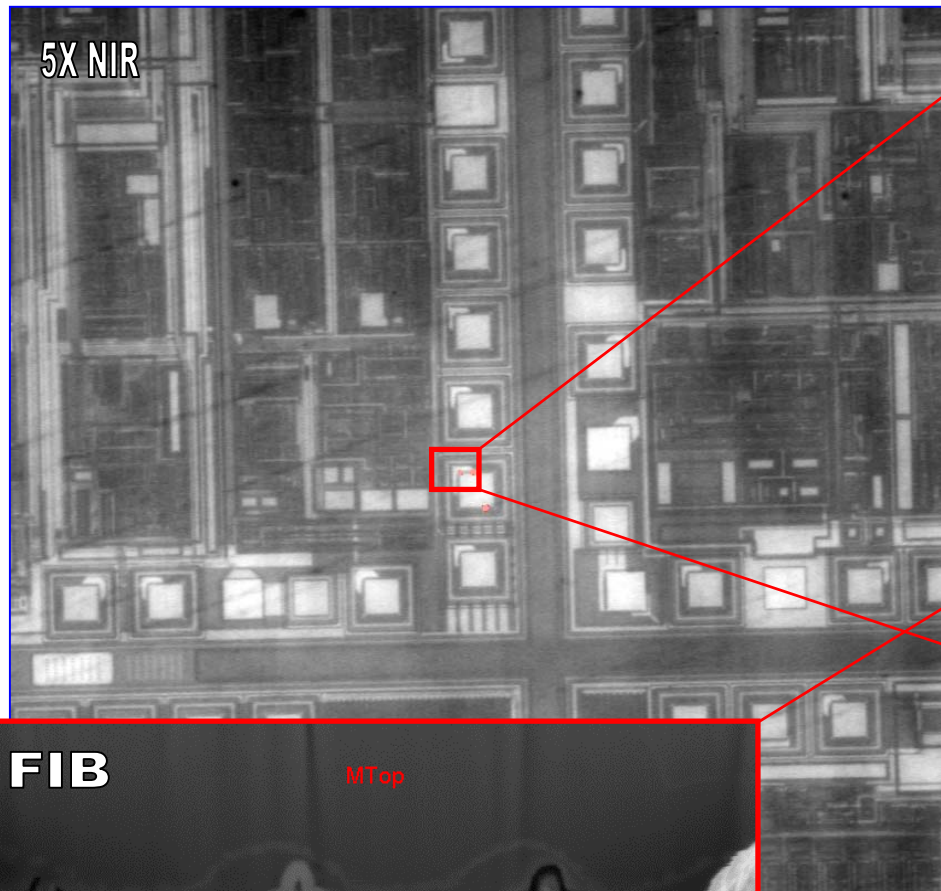
- 4 inch back side
- 6 inch back side



Sample - requirements:

100-200 um thickness of the sample (thinner better)

First experiment performed on PHEMOS-1000 in ONPY2 (Back side)



Background:

Part: Confidential

Technology: PowerSense 5LV

Units at the edge of the wafers were failing because of increased leakage of protective ESD diodes. By help of new installed photoemission microscope, photoemission centers were localized and FIB cut was performed. The root cause was found and qualified as missing TiW barrier between AlCu and Si (Metal1).