



# Signal & Imaging Processing Algorithms

Our product – our offer to you

December 2025



## FIELDS OF APPLICATION

Our services are applied in a variety of sectors – each solution can be tailor-made by request

**Dynamic range conversion**  
Enhancing sharpness  
correction of over- and  
underexposure  
Preserving and highlighting  
image details



### INFRARED

**IMAGE QUALITY ASSESSMENT**  
No-reference IQA in SU\* require neither  
parametrization nor learning database

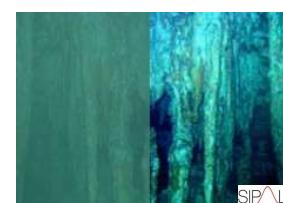


**Sharpness enhancement**  
Correction of under- or  
overexposure  
Restoration of objects in  
shadow areas



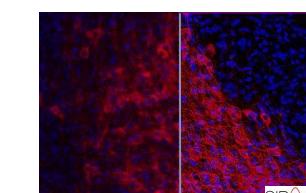
### AERIAL PHOTOGRAPHY

### UNDERWATER IMAGING



**Morphological de-blurring**  
Scattered light elimination  
or weakening

### QUALITY ASSURANCE



### MICROSCOPY

**Highlighting of details**  
Accentuating desired  
image properties





## AERIAL PHOTOGRAPHY: NIGHT VISION

### Recover the quality: sharpness enhancement and exposure compensation

Correction of under- or overexposure & Improvement of detail representation





## AERIAL PHOTOGRAPHY: NIGHT VISION

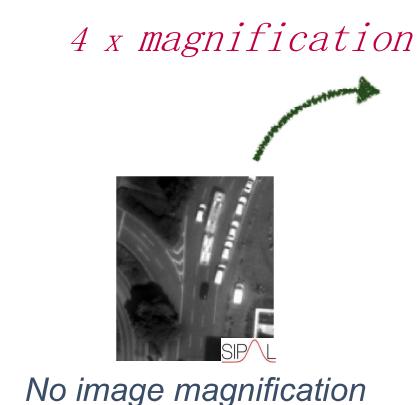
### Recover the quality: sharpness enhancement and image magnification

Correction of under- or overexposure & Improvement of detail representation



No image enhancement

SIPAL image enhancement



No image magnification



SIPAL image magnification

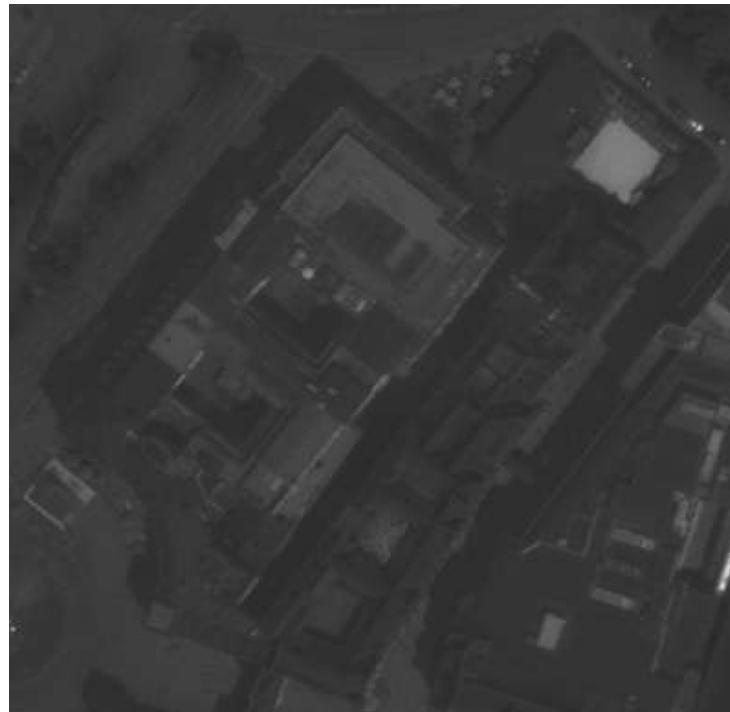




## AERIAL PHOTOGRAPHY: NIGHT VISION

Recover the quality: sharpness enhancement and  
restoration of objects in shadow areas

Correction of under- or overexposure & Improvement of detail representation



*No image enhancement*



*SIPAL image enhancement*

SIPAL



## IMAGE QUALITY ENHANCEMENT: VISION WITH FOG

Recover the quality: sharpness enhancement and exposure compensation

Correction of under- or overexposure & Improvement of detail representation



*No image enhancement*



*SIPAL image enhancement*

SIPAL

SIPAL



## IMAGE QUALITY ENHANCEMENT: VISION WITH SMOG

Recover the quality: sharpness enhancement and exposure compensation

Correction of under- or overexposure & Improvement of detail representation



*No image enhancement*



*SIPAL image enhancement*



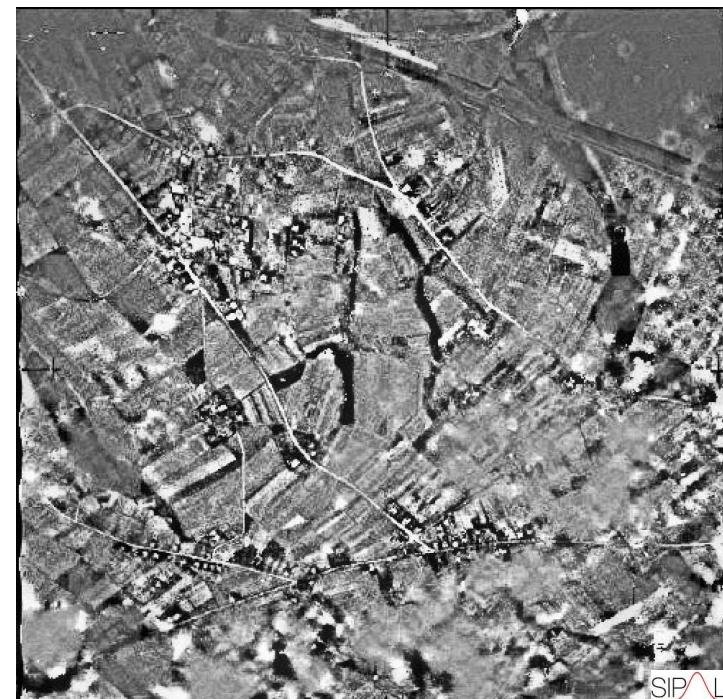
## IMAGE QUALITY ENHANCEMENT: VISION THRU CLOUDS

### Recover the quality: sharpness enhancement and exposure compensation

Correction of under- or overexposure & Improvement of detail representation



*No image enhancement*



*SIPAL image enhancement*





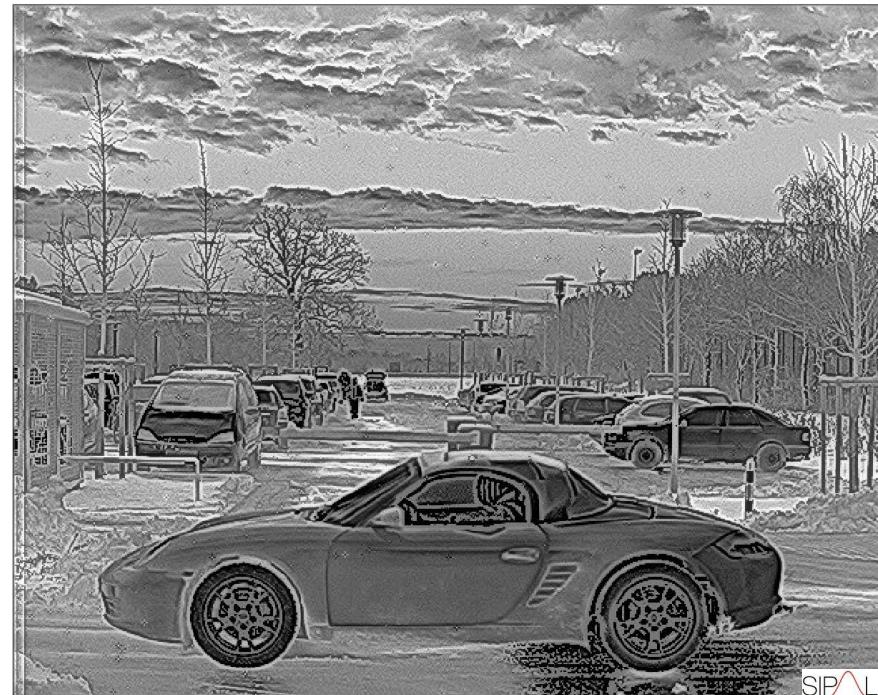
## IMAGE QUALITY ENHANCEMENT: NIGHT VISION DEVICE

Recover the quality: sharpness enhancement and exposure compensation

Correction of under- or overexposure & Improvement of detail representation



*No image enhancement*



*SIPAL image enhancement*





## IMAGE QUALITY ENHANCEMENT: NIGHT VISION DEVICE

### Recover the quality: sharpness enhancement and exposure compensation

Correction of under- or overexposure & Improvement of detail representation



*No image enhancement*



*SIPAL image enhancement*

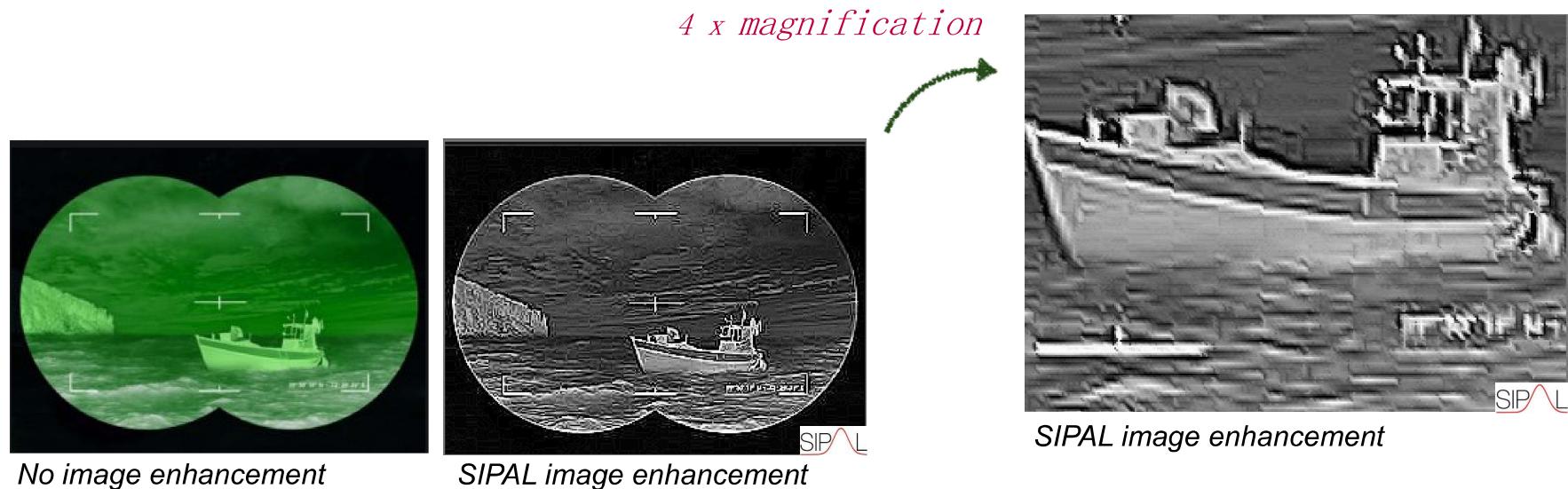




## IMAGE QUALITY ENHANCEMENT: NIGHT VISION DEVICE

Image or ROI\*) magnification with sharpness recovery and exposure compensation

Correction of under- or overexposure & Improvement of detail representation



\*)ROI: region of interest



## OVERVIEW INFRARED

Compared to conventional image enhancers, SIPAL is able to improve the image's quality regarding a variety of factors

Comparison of images enhanced with SIPAL's algorithm

automatic  
parameter setting

	Morphological deblurring	Details enhancement	Zero-loss magnification
Original, no enhancement			
Conventional enhancement			
SIPAL			

### SIPAL advancements

- Deblur independent of exposure differences within the image
- Multiple enlargement (up to 10x) of the original image or one of its areas w/o loss of image quality or w/ simultaneous quality enhancement
- The information you need is in your image, we have the tools for digging it out



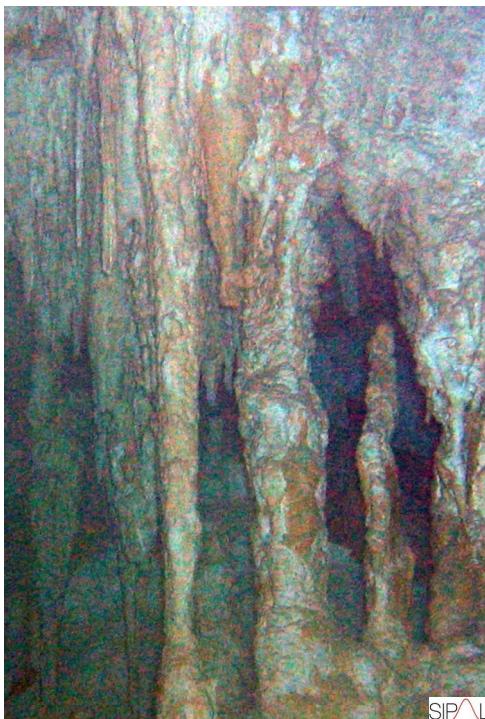
## UNDERWATER IMAGING

Lifting underwater images to another level – without expensive or highly professional equipment

Correction of under- or overexposure & Improvement of detail representation



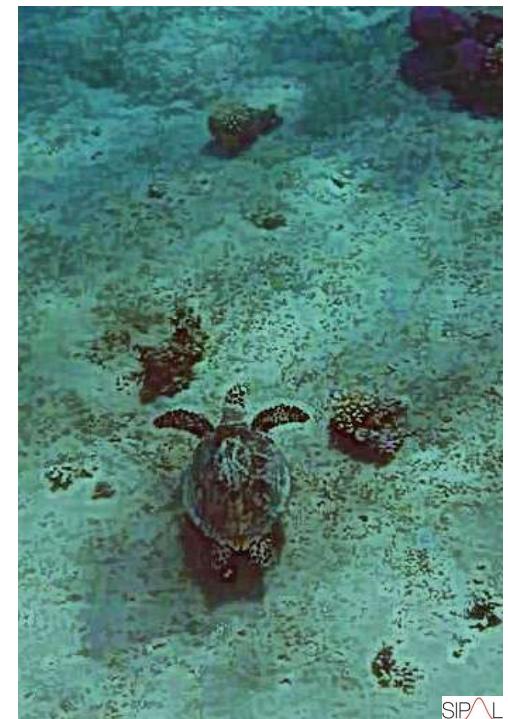
*No image enhancement*



*SIPAL image enhancement*



*No image enhancement*



*SIPAL image enhancement*





## UNDERWATER IMAGING

Lifting underwater images to another level – without expensive or highly professional equipment

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*No image enhancement*



*SIPAL image enhancement*

SIPAL



## OVERVIEW UNDERWATER IMAGING

Compared to conventional image enhancers, SIPAL is able to improve the image's quality regarding a variety of factors

Comparison of images enhanced with SIPAL's algorithm

	Morphological deblurring	Details enhancement	Zero-loss magnification
Original, no enhancement			
Conventional enhancement			
SIPAL			

*water magig away*

### SIPAL advancements

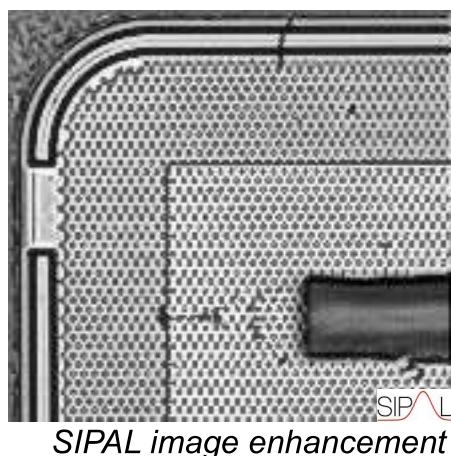
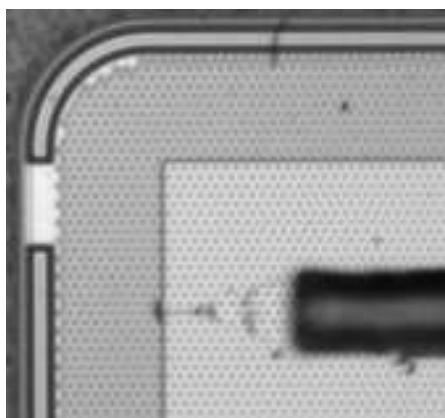
- Image sharpness recovery & diffused light elimination independent from exposure intensity
- Highlighting of hardly perceptible image details
- Multiple enlargement (up to 10x) of the original image or one of its areas w/o loss of image quality or w/ simultaneous quality enhancement



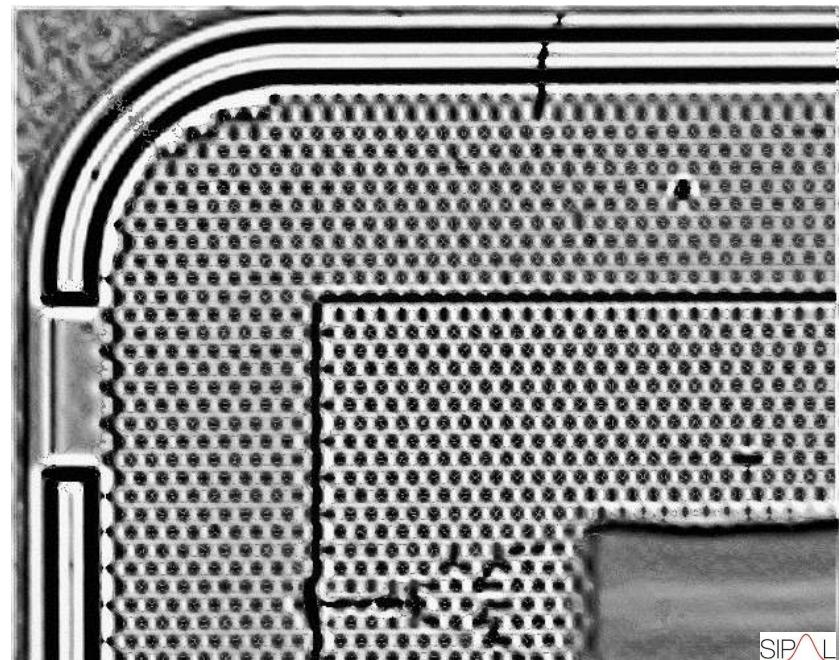
## IMAGE QUALITY ENHANCEMENT: MICROSKOPY

### Image or ROI\*) magnification with sharpness recovery

Correction of under- or overexposure & Improvement of detail representation



*4 x magnification*



*No image enhancement*

*SIPAL image enhancement*

*SIPAL image enhancement*

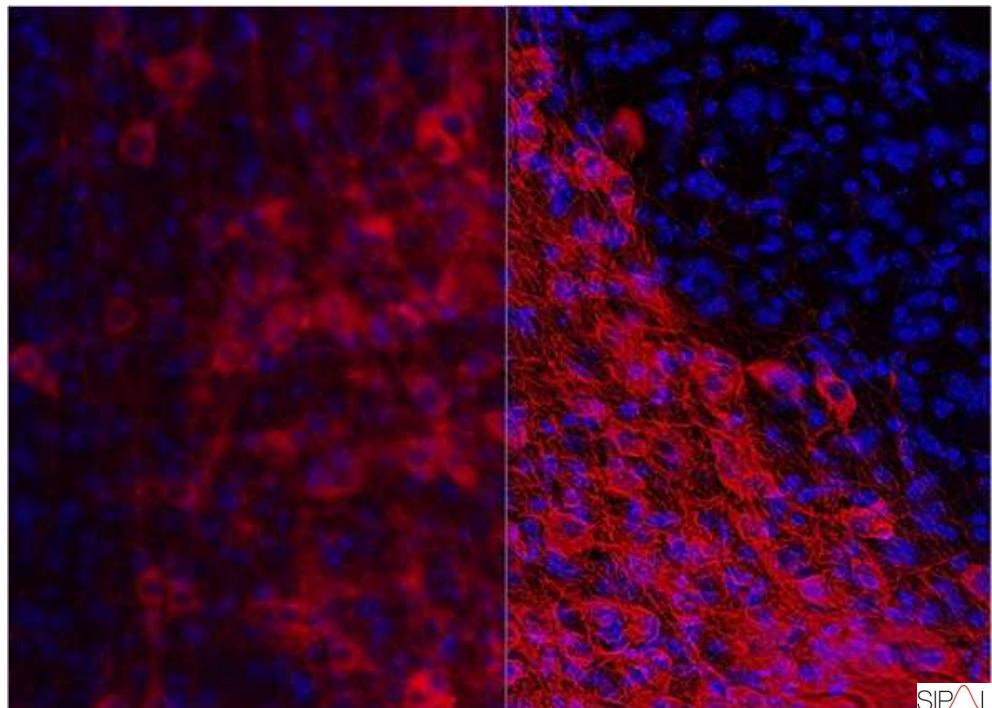
*\*)ROI: region of interest*



## IMAGE QUALITY ENHANCEMENT: FLUORESCENCE MICROSCOPY

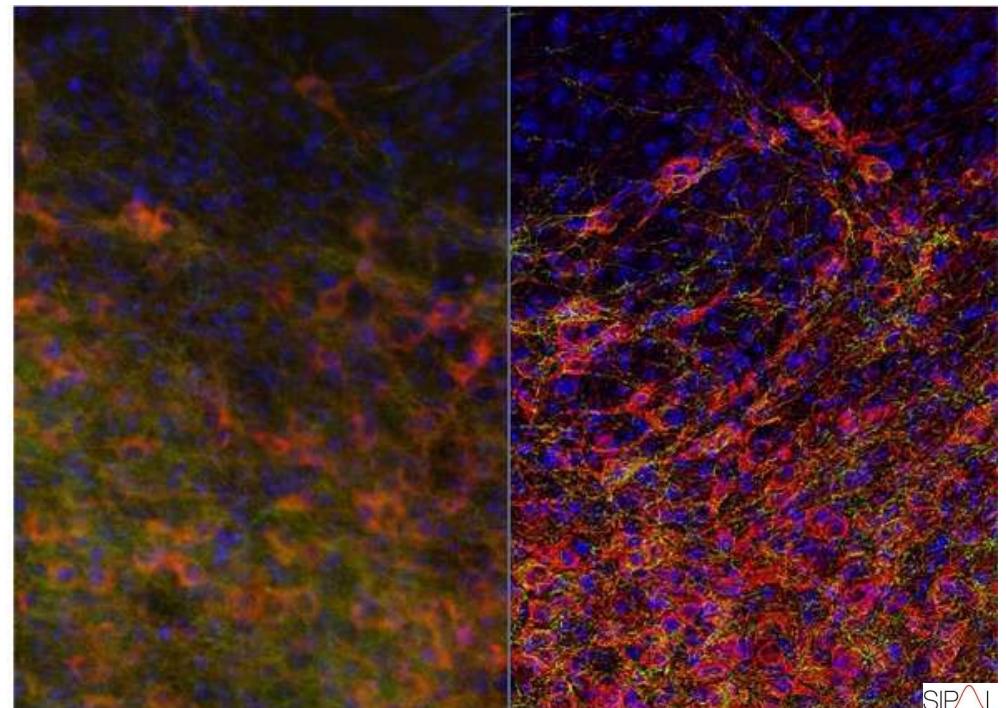
### Recover the quality: sharpness enhancement and noise reduction

Correction of under- or overexposure & Improvement of detail representation



*No image enhancement*

*SIPAL image enhancement*



*No image enhancement*

*SIPAL image enhancement*

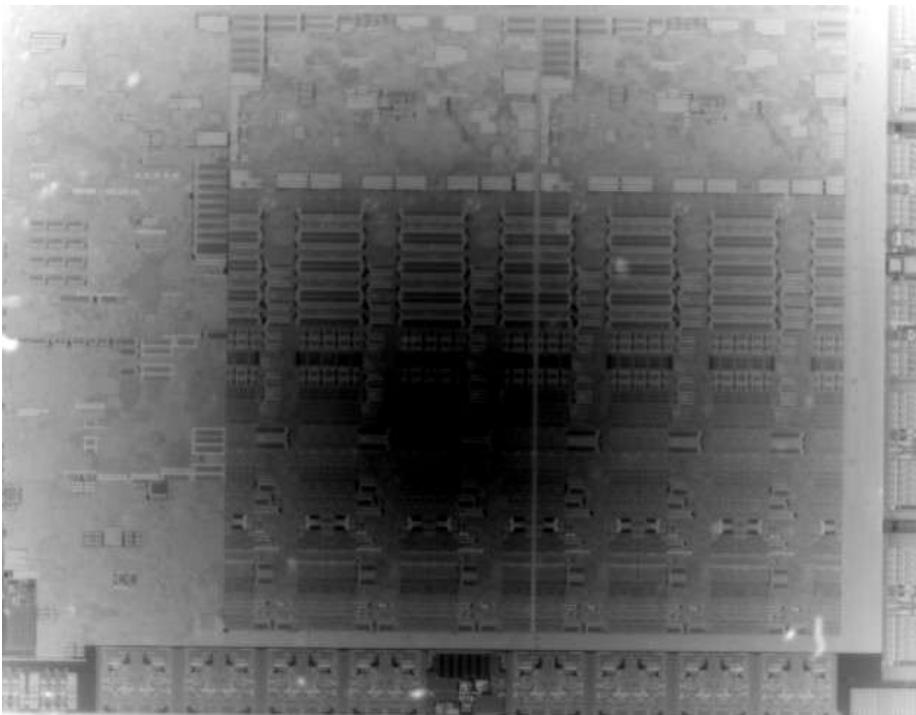




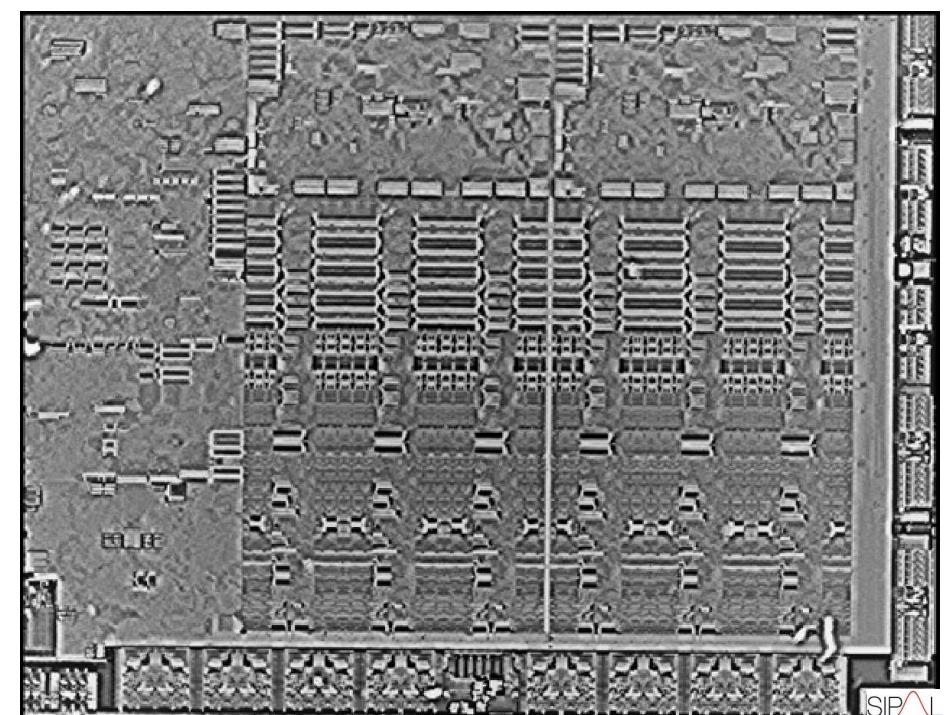
## IMAGE QUALITY ENHANCEMENT: INFRARED MICROSOKPY

Sharpness recovery and sensitivity improvement independent from irradiation sources and imaging methods

Correction of under- or overexposure & Improvement of detail representation



*No image enhancement*



*SIPAL image enhancement*





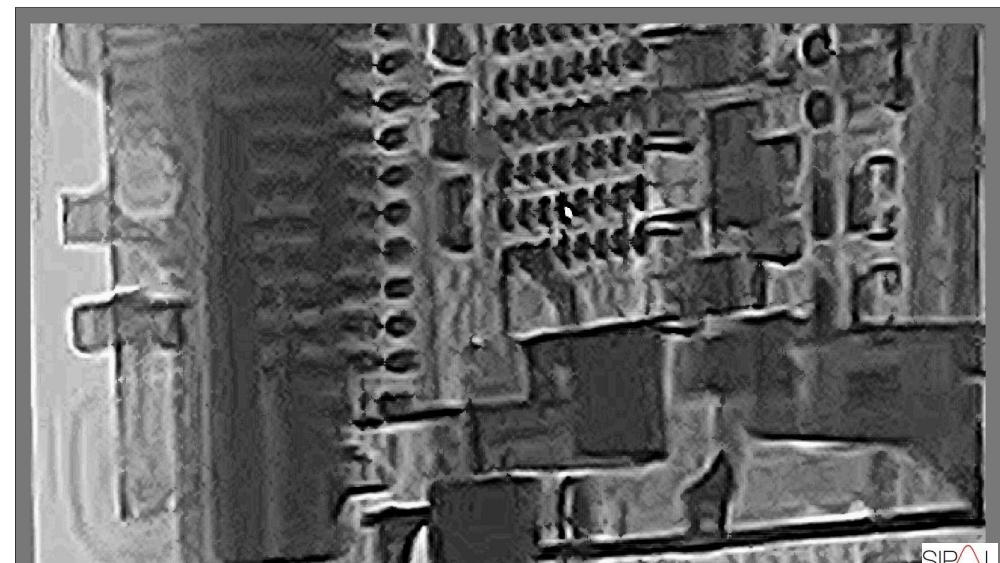
## IMAGE QUALITY ENHANCEMENT: X-Ray MICROSOPY

Sharpness recovery and sensitivity improvement independent from irradiation sources and imaging methods

Correction of under- or overexposure & Improvement of detail representation



*No image enhancement*



*SIPAL image enhancement*



## IMAGE QUALITY ASSESEMENT (IQA)

Our objective no-reference IQA in  $SU^*$  require neither parametrization nor learning database

SIPAL IQA is fast & is easy to apply, even on large stacks

BLURRY (negative values)

**IQA value - 269 SU**



SHARP (positive values)

**IQA value: 266 SU**



<sup>\*)</sup> Sharpness Unit



## IMAGE QUALITY ASSESEMENT (IQA)

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SIPAL IQA is fast & is easy to apply, even on large stacks

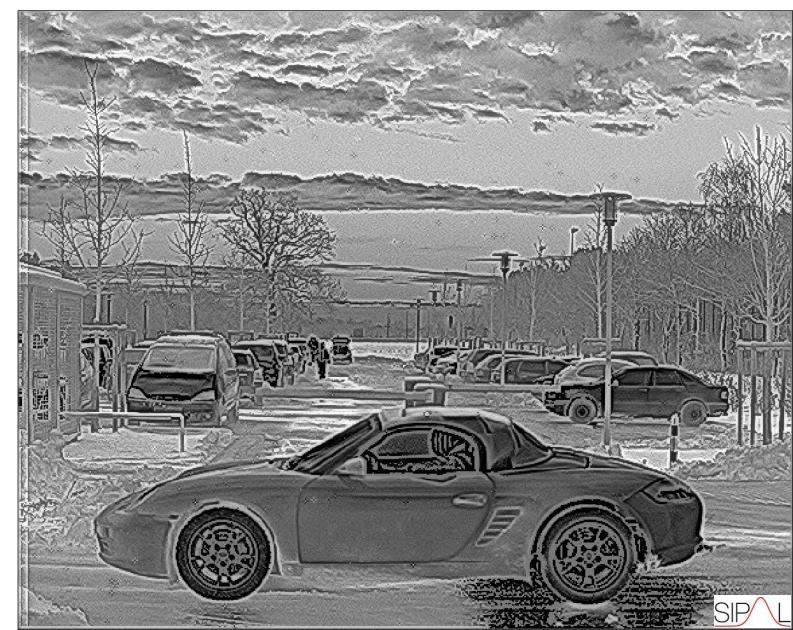
BLURRY (negative values)

**IQA value - 296 SU**



SHARP (positive values)

**IQA value: 344 SU**



<sup>\*)</sup> Sharpness Unit



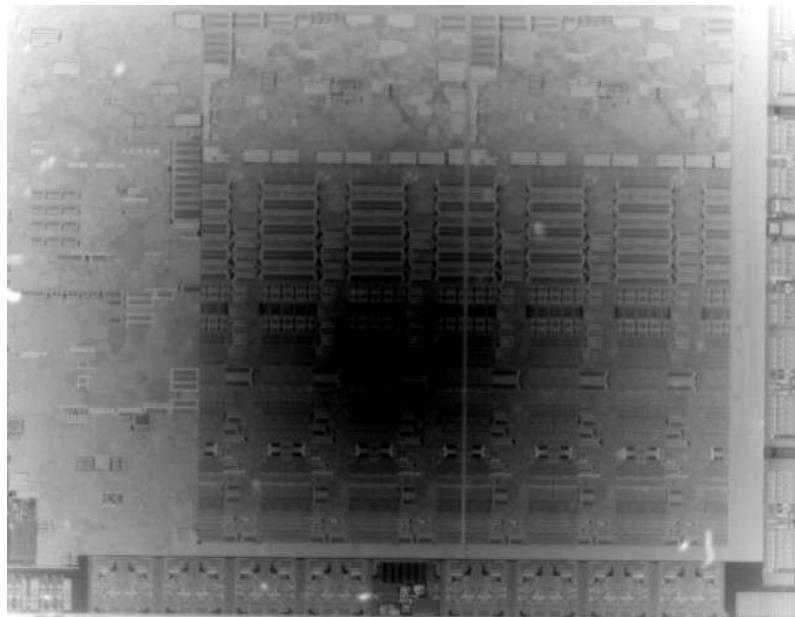
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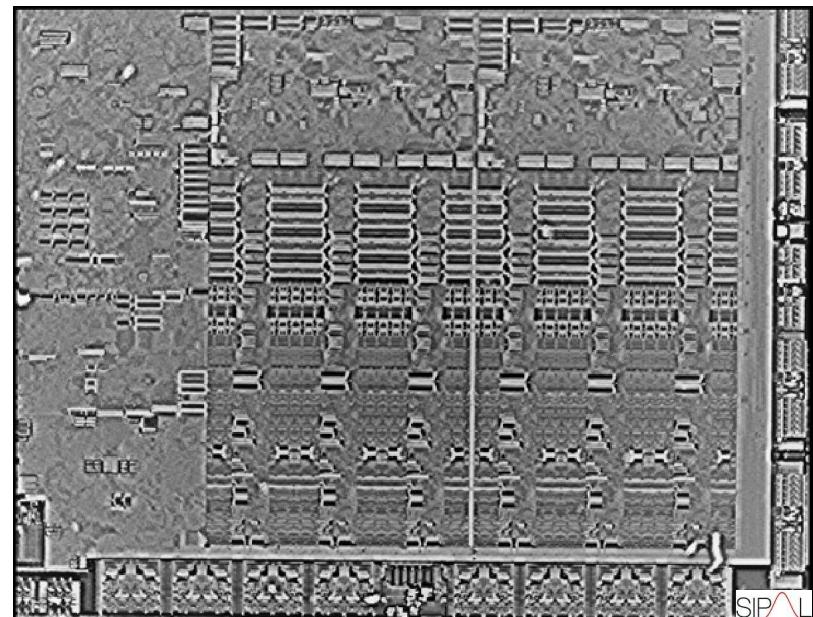
BLURRY (negative values)

**IQA value - 296 SU**



SHARP (positive values)

**IQA value: 346 SU**



<sup>\*)</sup> Sharpness Unit

... and what we don't

## SIPAL approach substantially differs from common methods

### CONVENTIONAL TECHNOLOGY

**Histogram adjustment** as an overall, unspecific contrast enhancement filter decrease image quality and leads to loss of image **details**

**Fourier filtering** and other frequency filter as well as blur subtraction by **deconvolution** favour unpredictable **artefact** generation

Local image disturbances favour generation of **shadows** or bright/dark spots by utilisation of **unsharp masking**

### SIPAL TECHNOLOGY

**No loss of details**



**No artefacts\***

**No shadows**

- **Object-based** algorithms
- **Morphological** filters, based on nonlinear neighbour operators
- **No additional information is added** to an image

**Use of no AI**

\* total absence of any kind of artefacts could not be granted





## CONTACT DETAILS

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