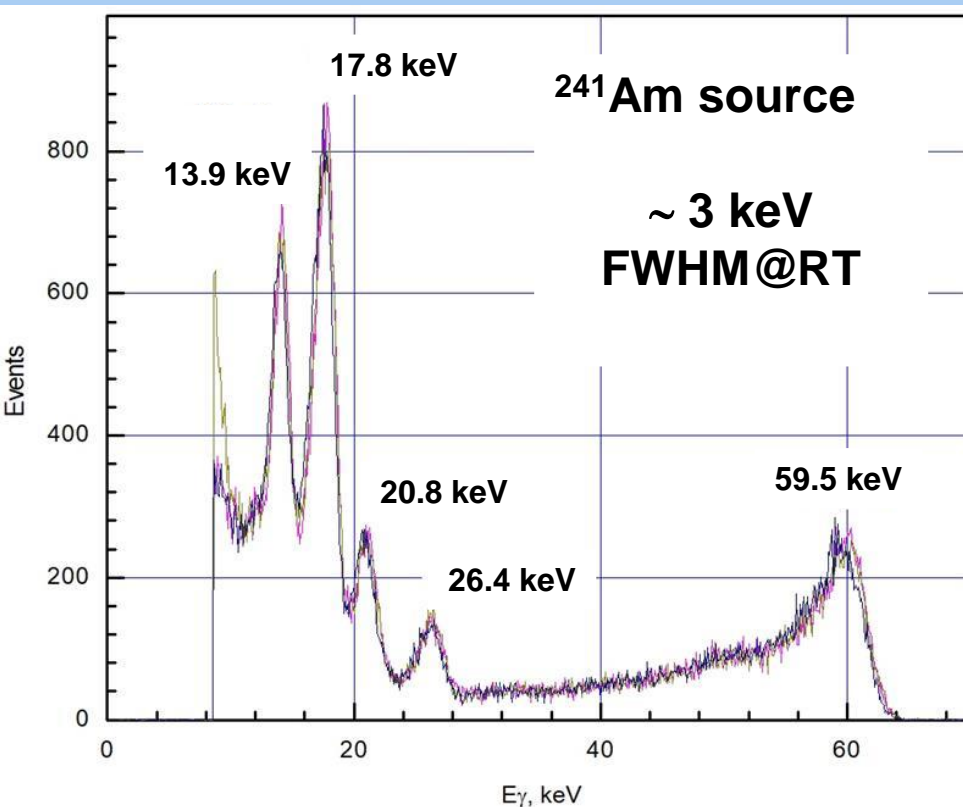


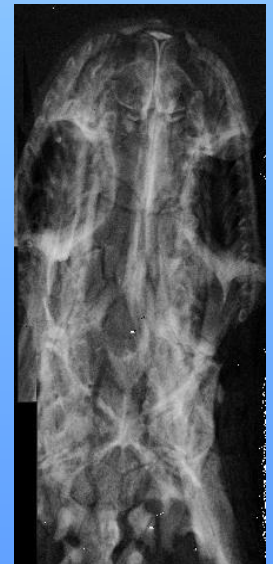
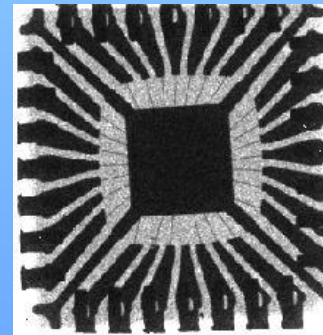
# Investigation of HR GaAs:Cr material and X-ray pad sensors made of VGF n-GaAs wafers

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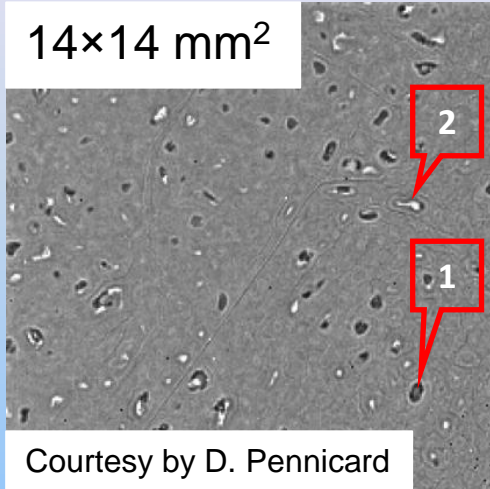
**X-ray HR GaAs:Cr  
pixel sensors**



# Mesoscopic inhomogeneities in LEC GaAs wafers

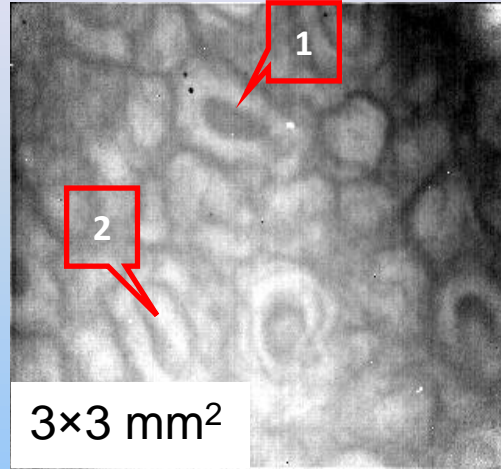
Count rate of X-ray quanta

14×14 mm<sup>2</sup>



Courtesy by D. Pennicard

IR mapping

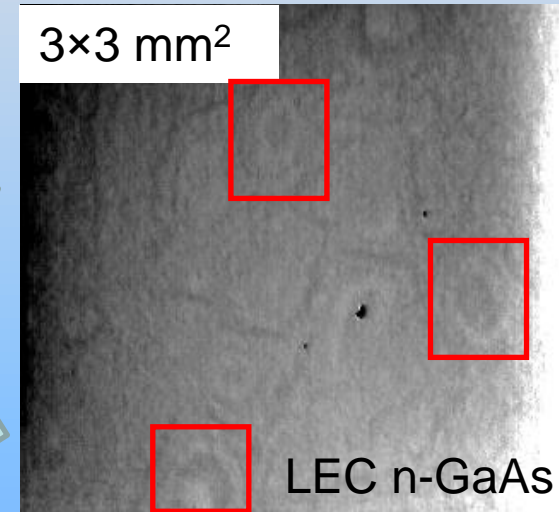


3×3 mm<sup>2</sup>

LEC technology of n-GaAs crystal growth

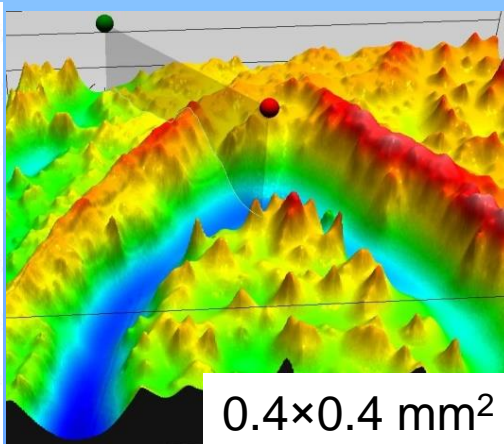
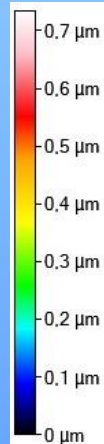
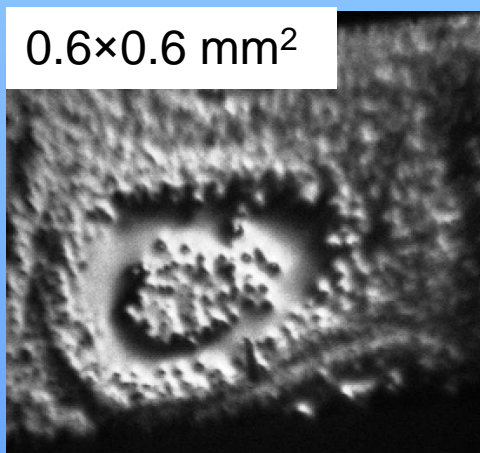
IR mapping

3×3 mm<sup>2</sup>



100 mm LEC HR GaAs:Cr,  $(\mu \times \tau)_n \approx 2 \times 10^{-4} \text{ cm}^2/\text{V}$

0.6×0.6 mm<sup>2</sup>



0.4×0.4 mm<sup>2</sup>

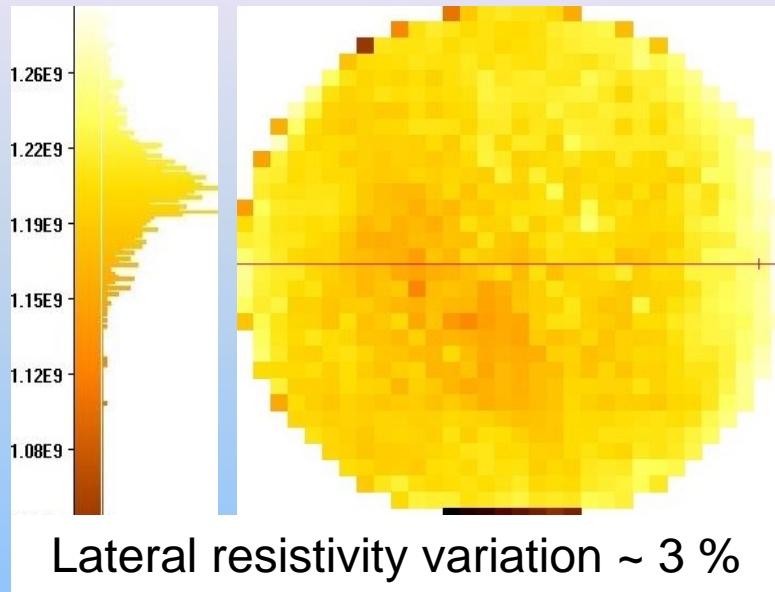
«Bubbles» and dislocation cells are originated by n-GaAs crystal growth technology

Let's see on VGF GaAs crystals!

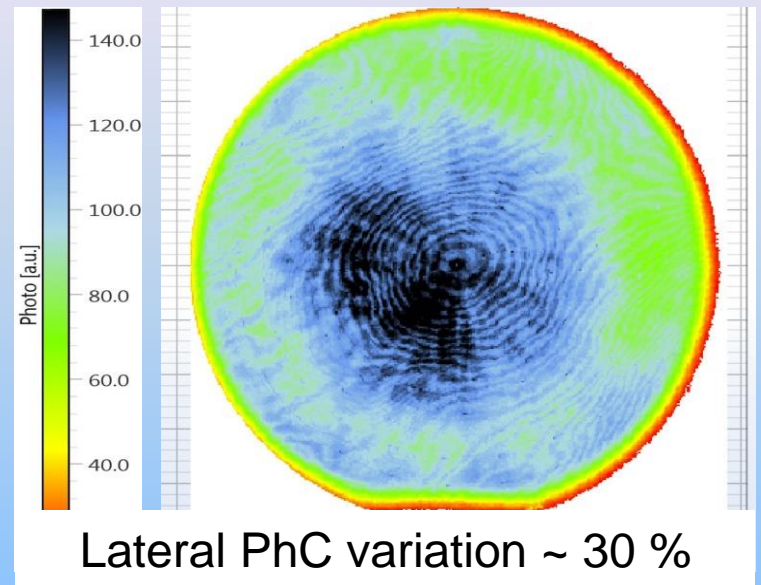
Surface of LEC HR GaAs:Cr wafer after DSL etching

# 100 mm VGF HR GaAs:Cr wafers

## Resistivity mapping

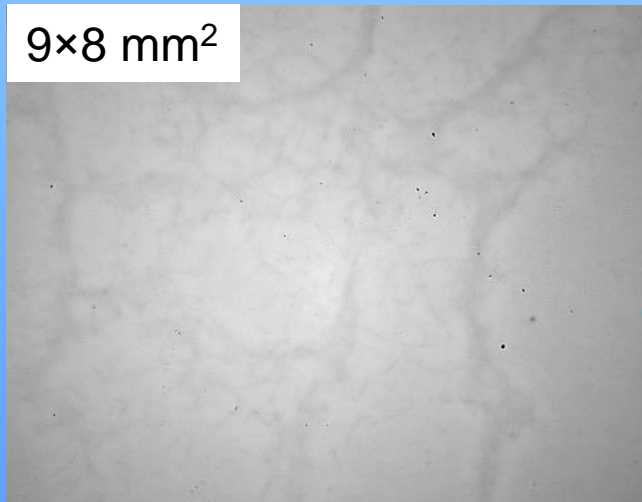


## Photoconductivity (PhC) mapping



## VGF HR GaAs:Cr

9×8 mm<sup>2</sup>

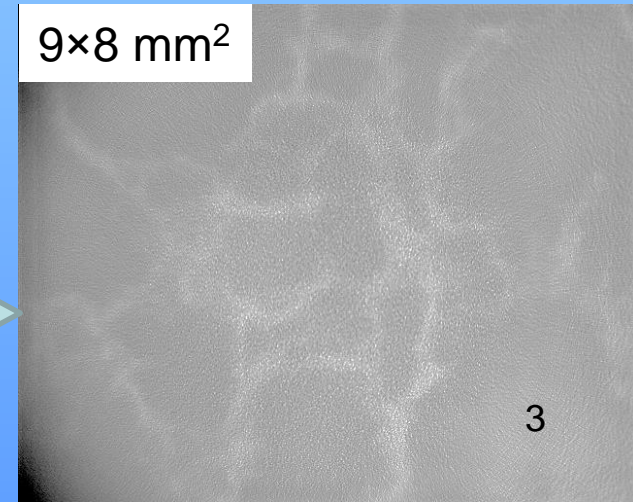


**No bubbles!**

Dislocation cells sizes  
up to 1 - 3 mm

## VGF n-GaAs

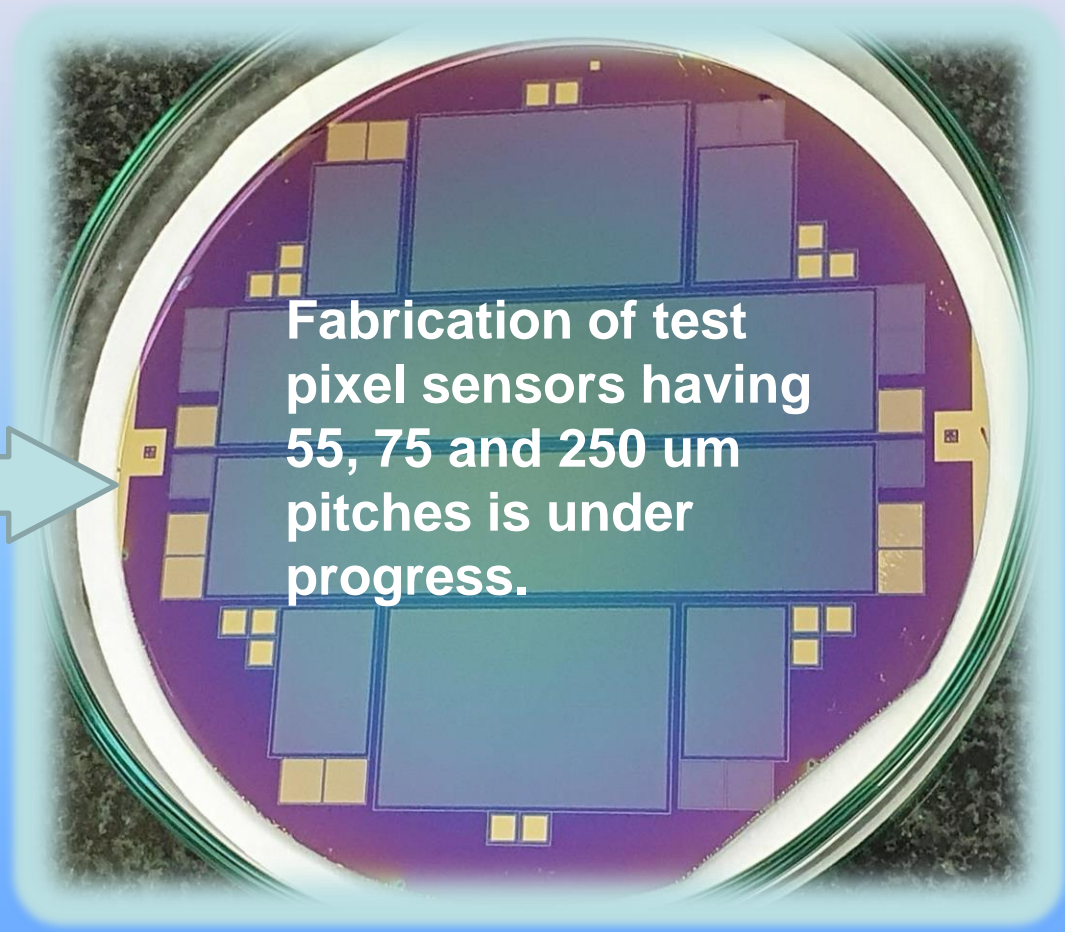
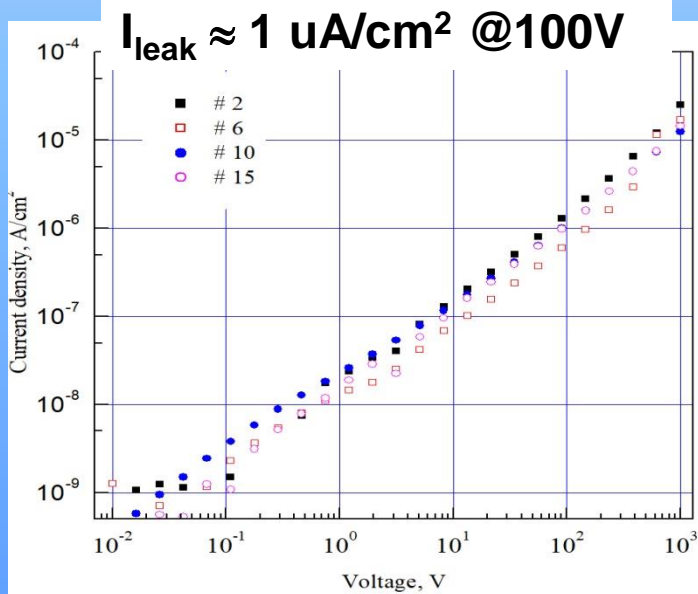
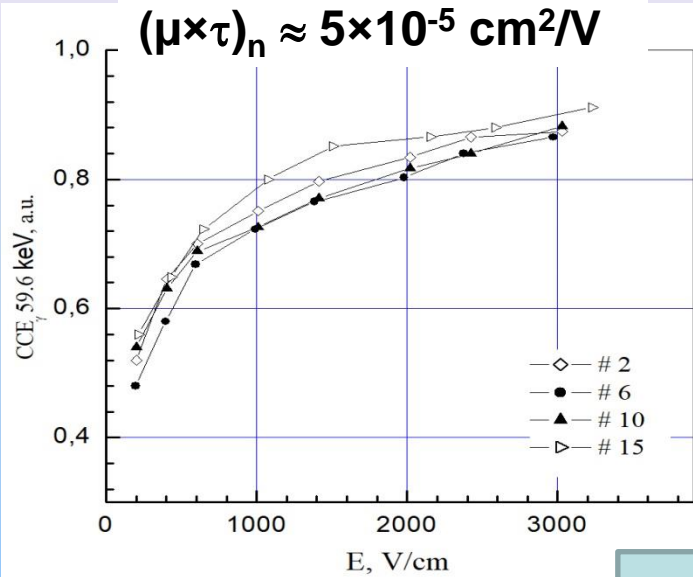
9×8 mm<sup>2</sup>



IR mapping



# VGF HR GaAs:Cr pad sensors



# Summary

- “Bubbles” already exist in some LEC n-GaAs crystals
- VGF GaAs material can be used to avoid “bubbles” issue
- VGF HR GaAs:Cr pixel sensors will be produced and delivered for testing within 2021

## Acknowledgement

Author thanks detector development teams from Tomsk State University, JINR, DESY, STFC RAL, ESRF and PSI for their efforts in X-ray HR GaAs:Cr pixel sensor investigations and hope to continue fruitful scientific co-operation!

Thank you for listening!