

Transition Edge Sensors:

Optimization of the Device Selection Process

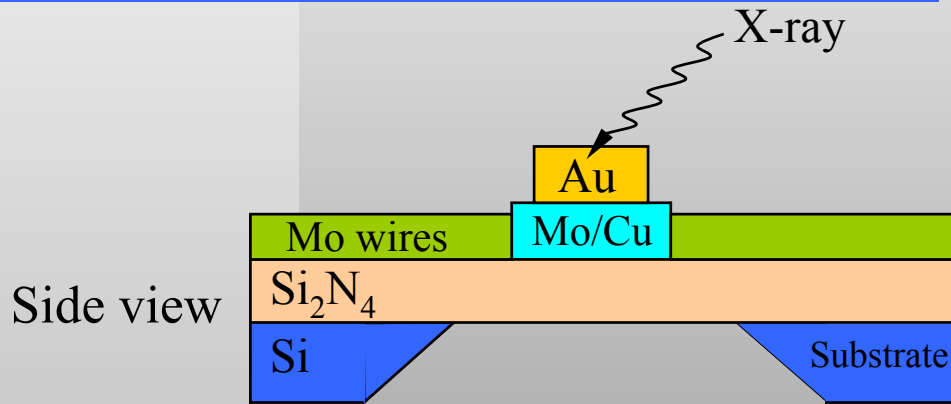
Kelvin Aaron

South Carolina State University

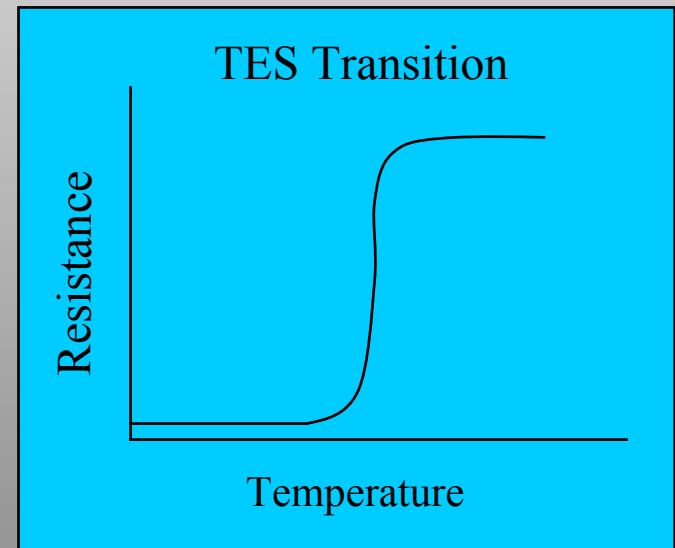
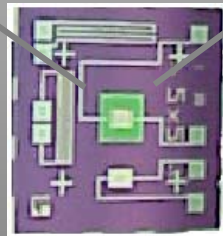
Topics

- **Transition Edge Sensors**
- **Project**
- **Conclusions**
- **The Big Picture**
- **Acknowledgements**

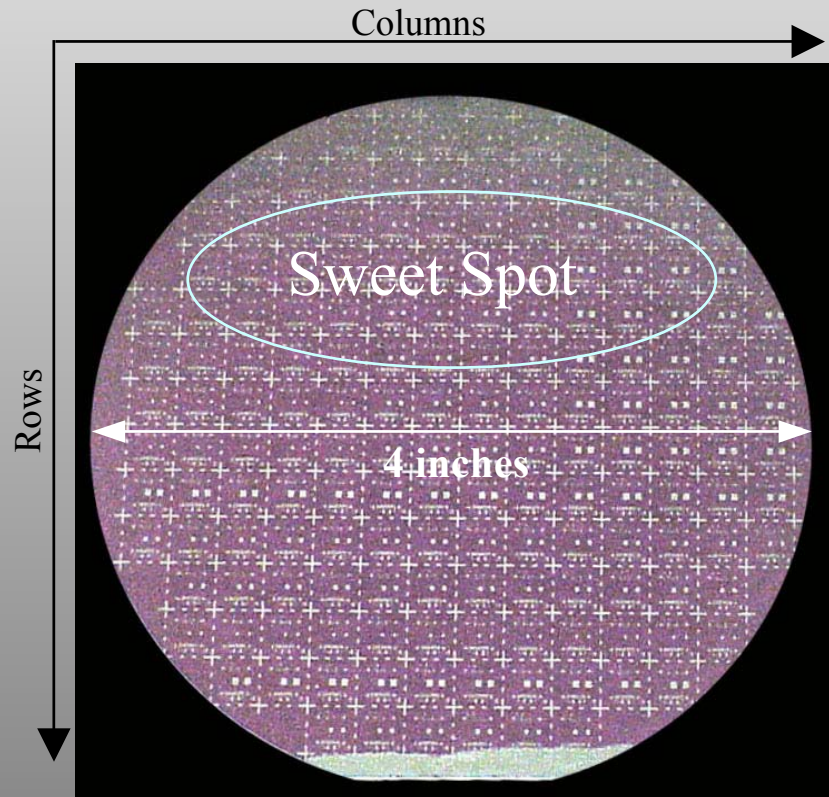
Transition Edge Sensors (TES)



Top view



TES-Device Selection



Major flat

Project

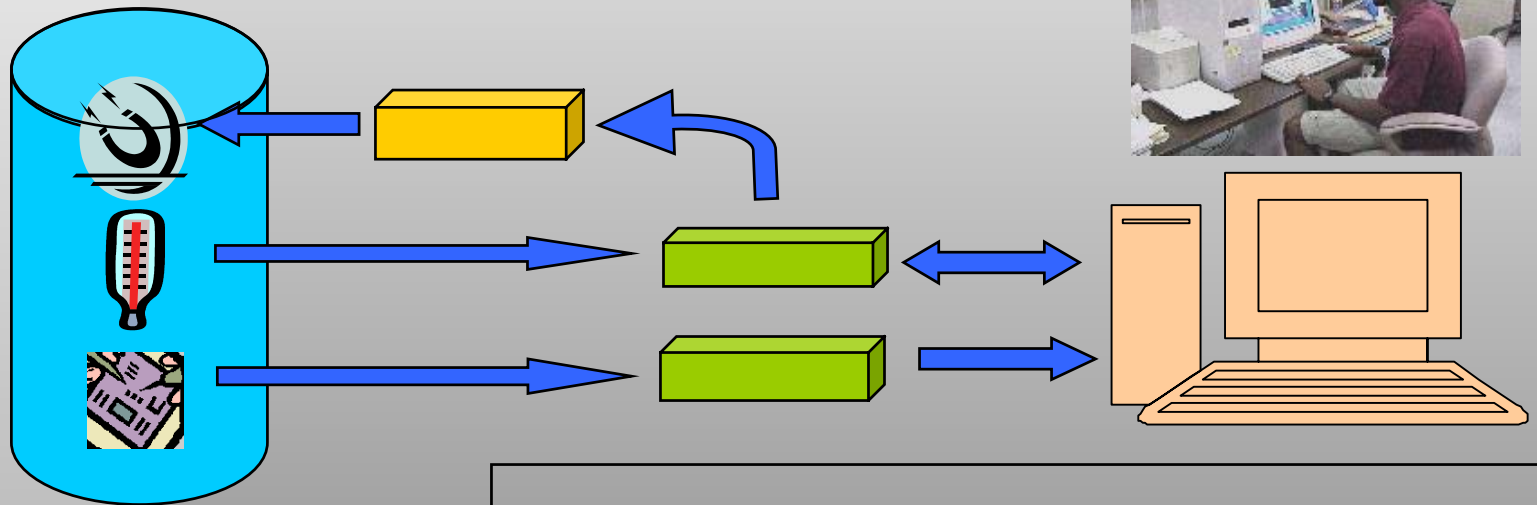
- **Premise**



- **Wafer manufacturing process is reproducible**
- **Devices in the same position on different wafers should display the same properties**
- **If the relationship between device position and its characteristics is defined, devices of specific characteristics can be chosen directly**

- **Project**

- **Define the relationship between Device position and T_c**

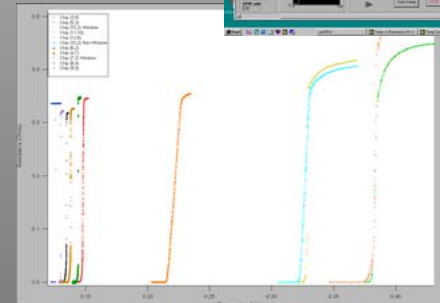
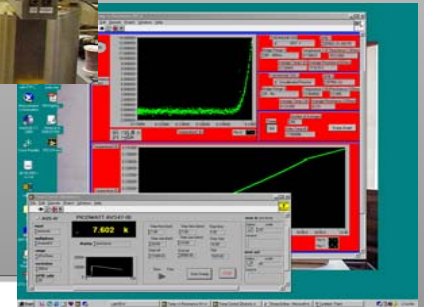
Setup



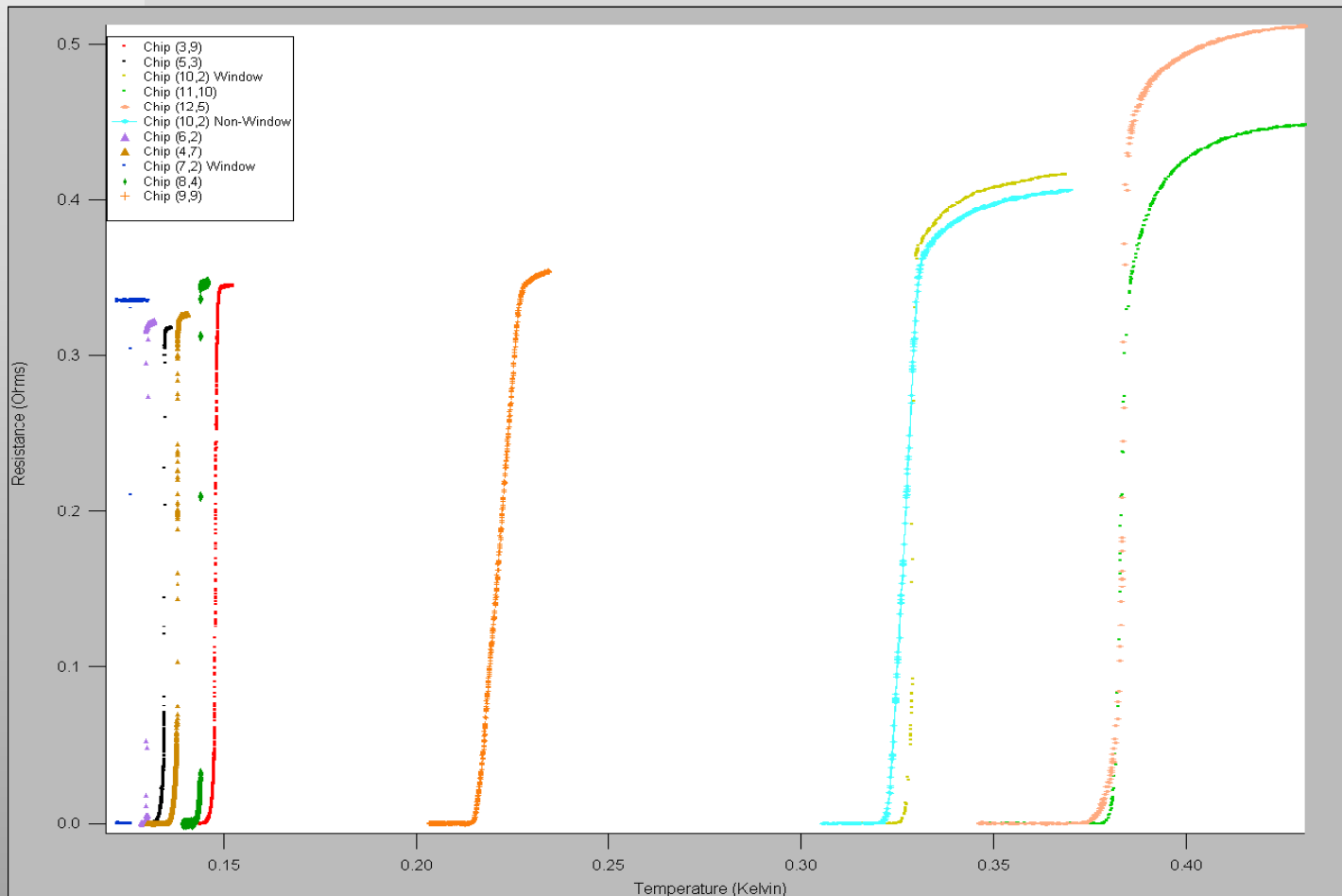
- | | | | |
|-------------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------------|------------------------|
|  | ADR Magnet |  | Cryostat |
|  | GRT Thermometer |  | Temperature Controller |
|  | TES |  | Resistance Bridge |
| | |  | Computer |

Process

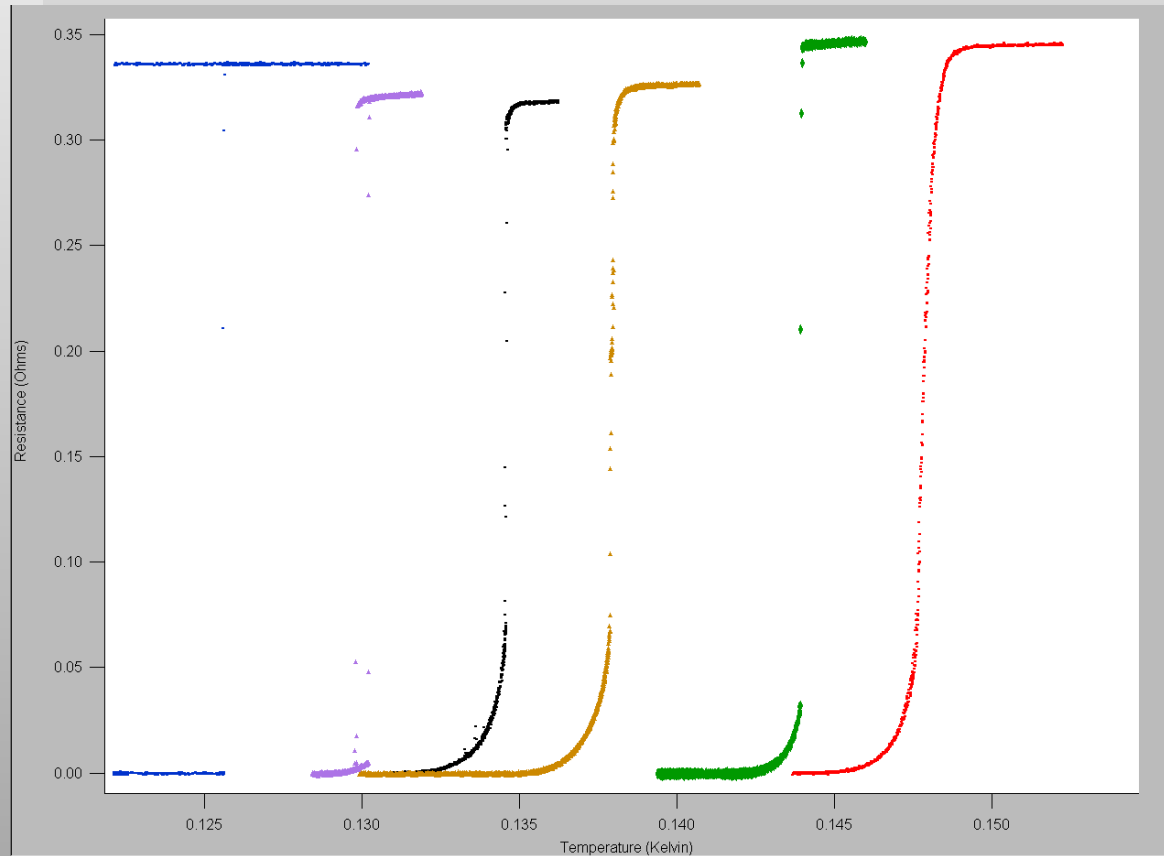
- Wire Devices
- Cool Down
- Temperature Control & Data Acquisition
- Data Analysis



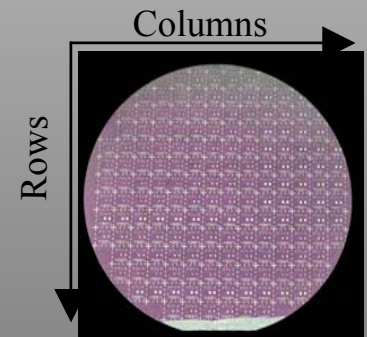
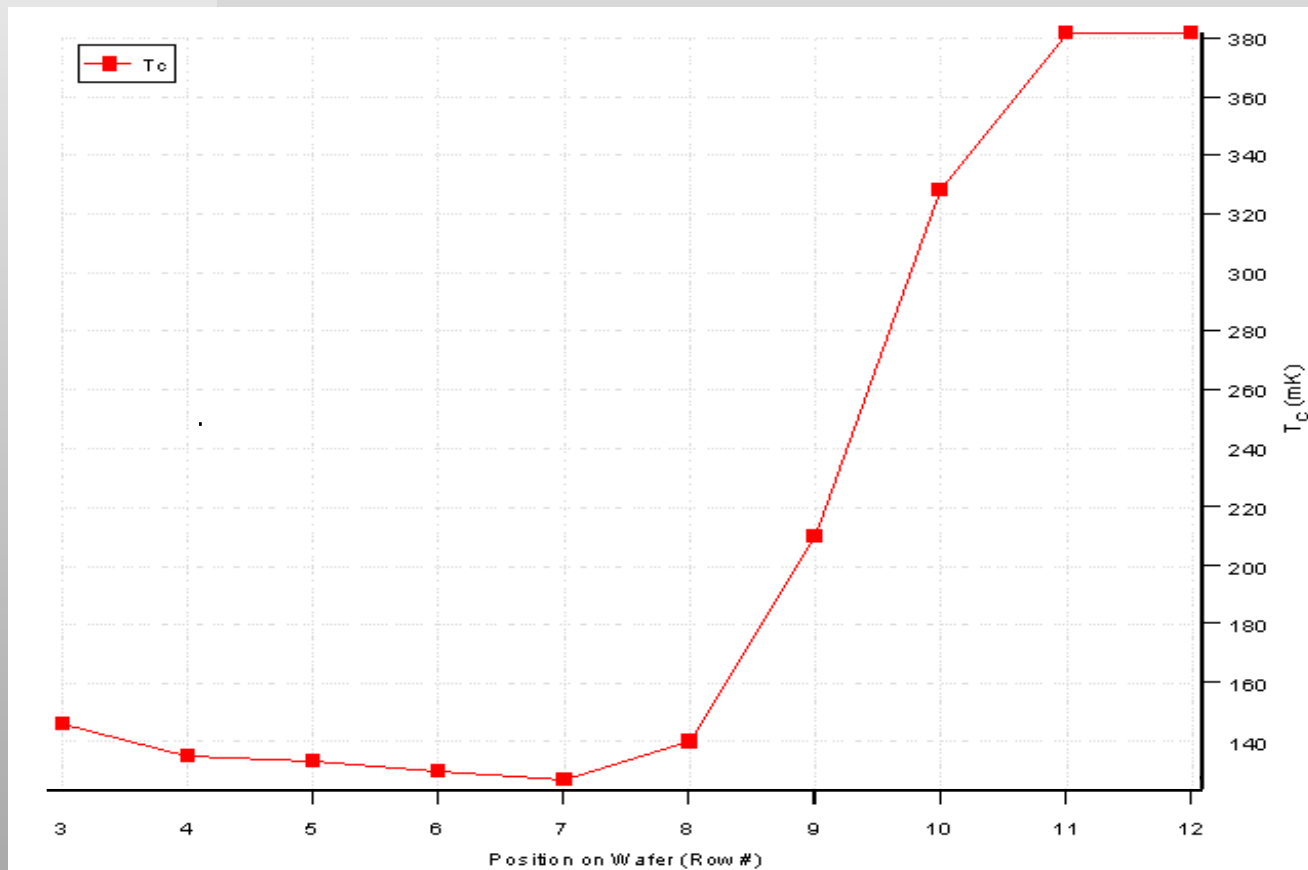
Results



Low- T_c Devices



Position- T_c Relationship



Conclusions

- **Temperature control program worked well**
 - User interface needs improvement
- **The relationship between row position and T_c was defined**
 - Non-dependence on column position should be confirmed

The Big Picture

- **X-ray and Gamma-ray Spectroscopy**
- **Homeland Security**
- **Medical Applications**
- **Astronomical Applications**

Acknowledgements

- Funding for this work has been provided by NASA MU-SPIN NCC 5-534 and NASA OSS NAG 5-10145.
- Zaheer Ali and The Advanced Detector Group at Lawrence Livermore National Laboratory
- Dr. James Payne