



University
of Glasgow

Research into THz Science and Technology at Glasgow University

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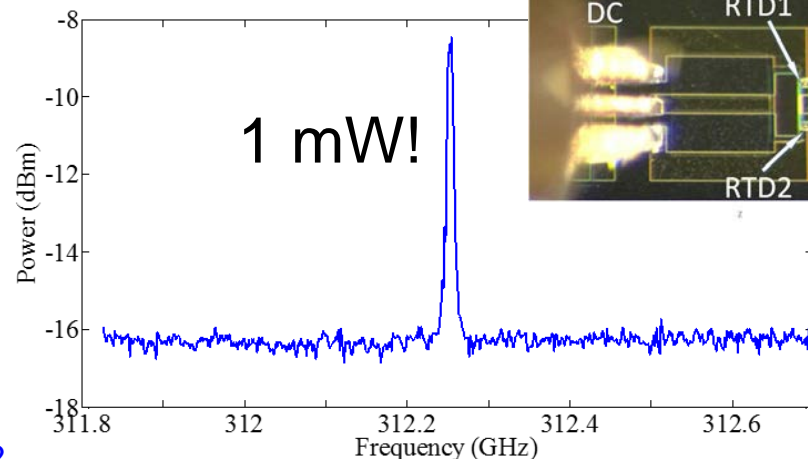
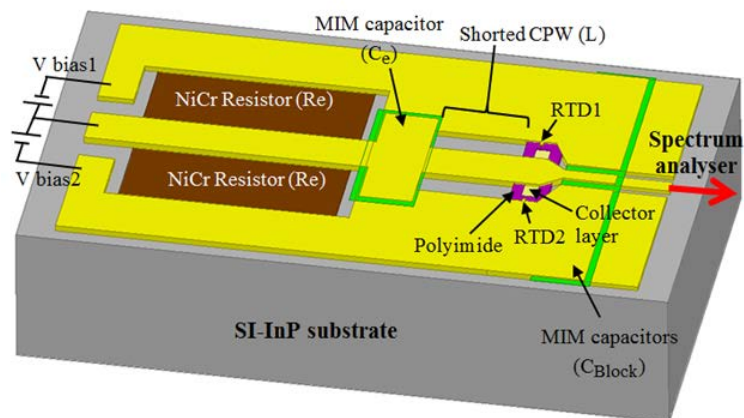
INSPIRING
PEOPLE





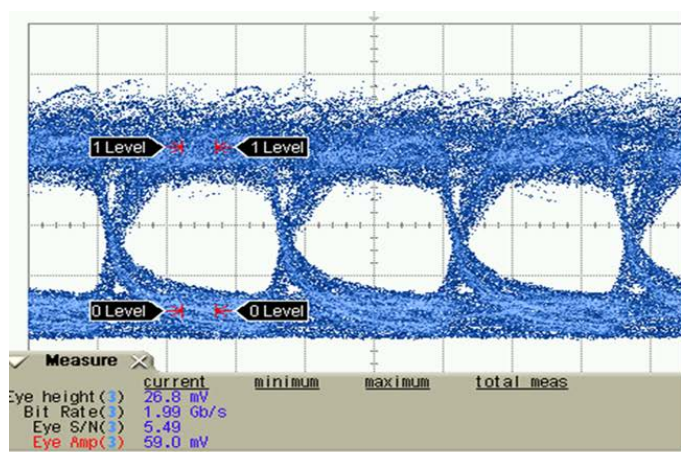
- Long history: nearly 20 years
- 10s of million pounds from UK government, EU and industries
- >10 research groups with > 20 researchers
- World-class nanofabrication facilities (JWNC)
- Two dedicated state-of-the-art THz laboratories
- Research areas from components to systems and applications:
 - sources (RTDs, Gunn diodes, QCLs, optical frequency beating),
 - detectors (bolometers, cameras),
 - circuits (TMICS),
 - components (lens, filters, resonators etc.),
 - Metrology,
 - applications: communications, imaging, and spectroscopy.

Resonant Tunnelling Diode based THz transmitters

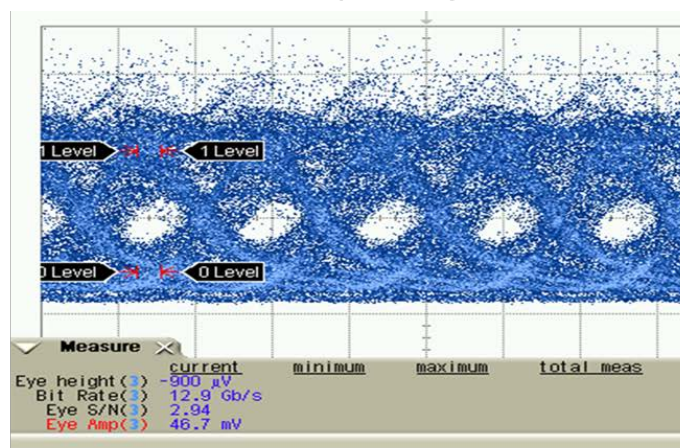


RTD Source: Device size: 9-16 μm^2

312 GHz RTD oscillator



2 Gbps; 0.3m range



13 Gbps; 0.3m range

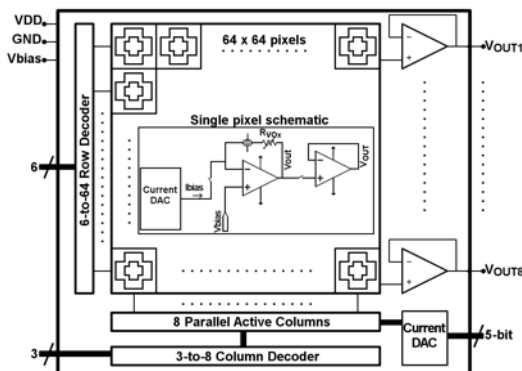
20 Gbps up to 20 m !



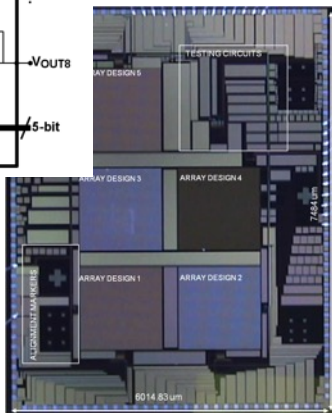
Horizon2020

THz Focal Plane Arrays

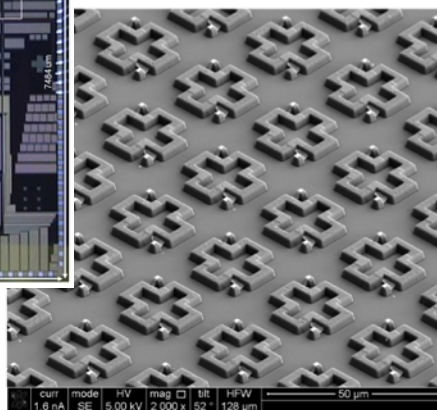
CMOS chip design and architecture



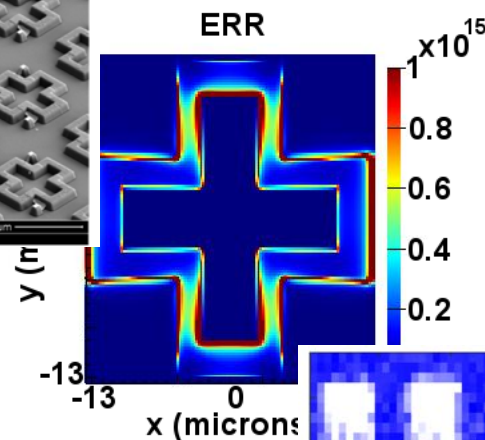
180 nm
foundry
technology



Integrated metasurface absorber



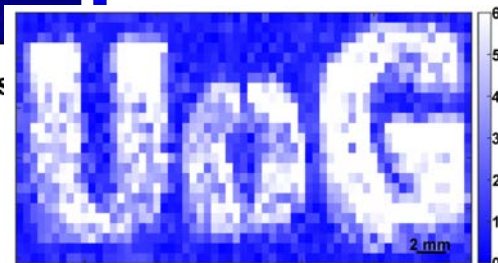
Resonance at 2.5 THz



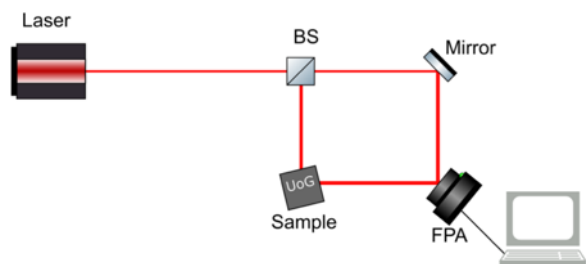
Handheld
cameras



Imaging of
concealed object

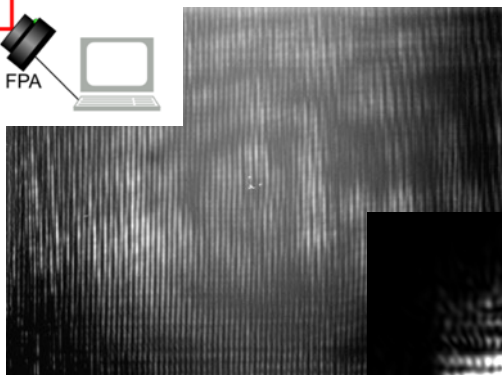


THz Holography



Lensless imaging system

Interferogram

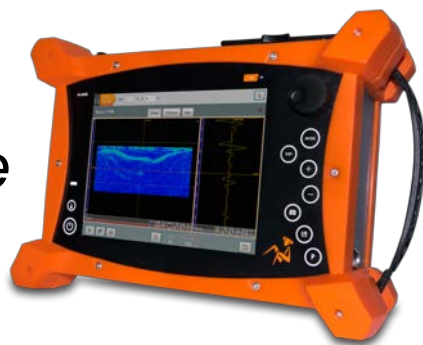


Imaging
concealed objects



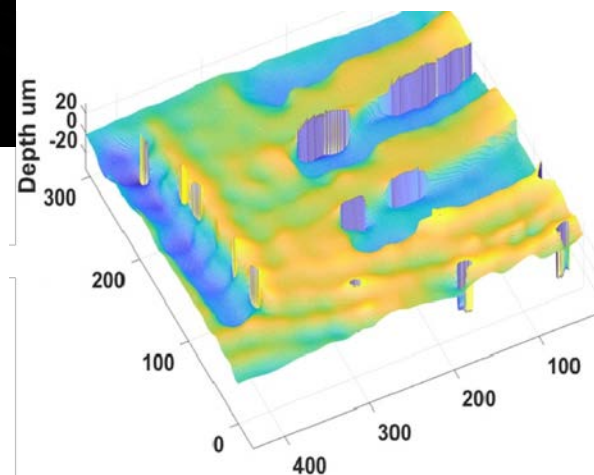
r-space image recovery
via FFT on GPU

*Non-
destructive
testing*

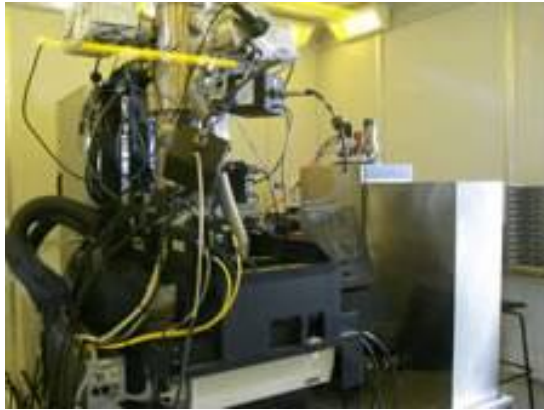


Real-time
processing
at 50 fps

Recover of 2D and
3D information



2 E-beam lithography tools



10 RIE / PECVD



4 Sputter tools



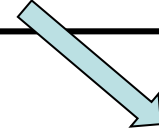
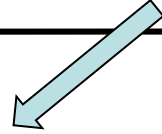
also optical lithography



- £55M Glasgow grant portfolio
- £65M outside Glasgow
- 1400 m² class 10-1000 cleanroom
- 25 technical staff and technologist
- Professional management team
- 204 researchers 16/17

Metrology (surface profiling, AFM,
SEMs + EDX, high/low voltage, low vac.)

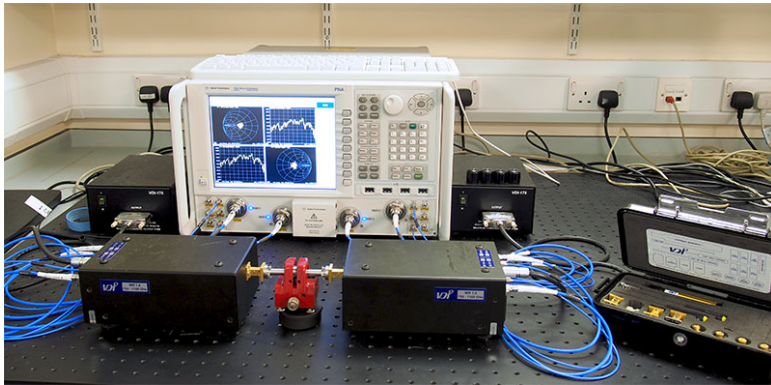
Two THz dedicated laboratories



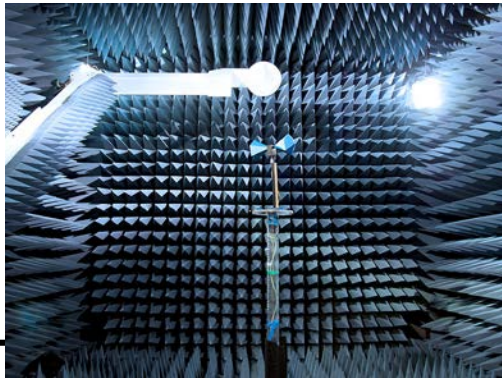
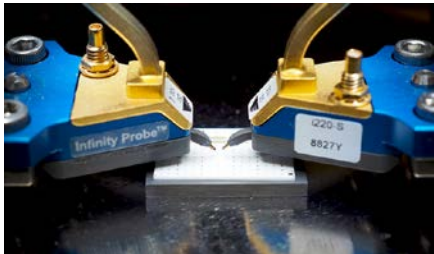
mmWave and THz electronics lab

THz Optics Lab

VNAs Upto 1.1 THz



On-wafer/free space spectrum, power & VNA upto 325 GHz



150mW 2.4 THz CW laser



Bruker FTIRx2 0.5THz-10 THz





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Thank You

Look forward to collaborating with you!

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#UofGWorldChangers



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