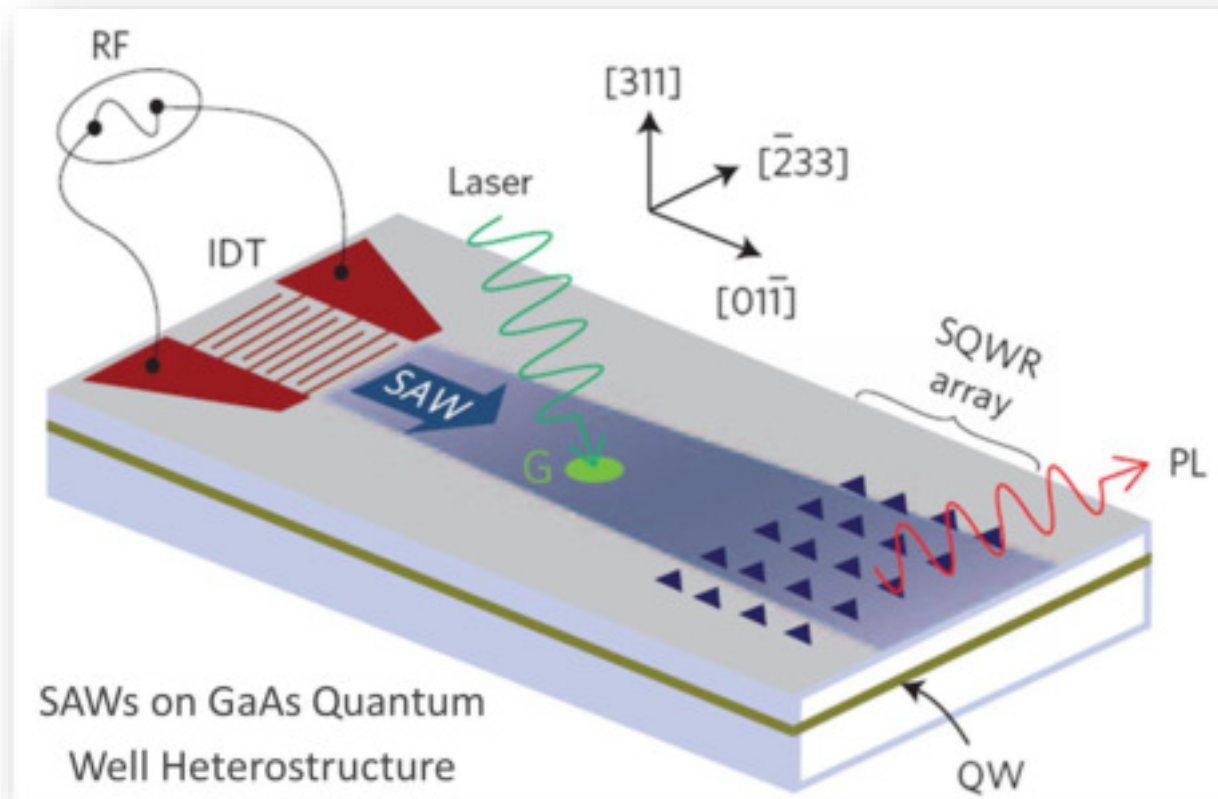
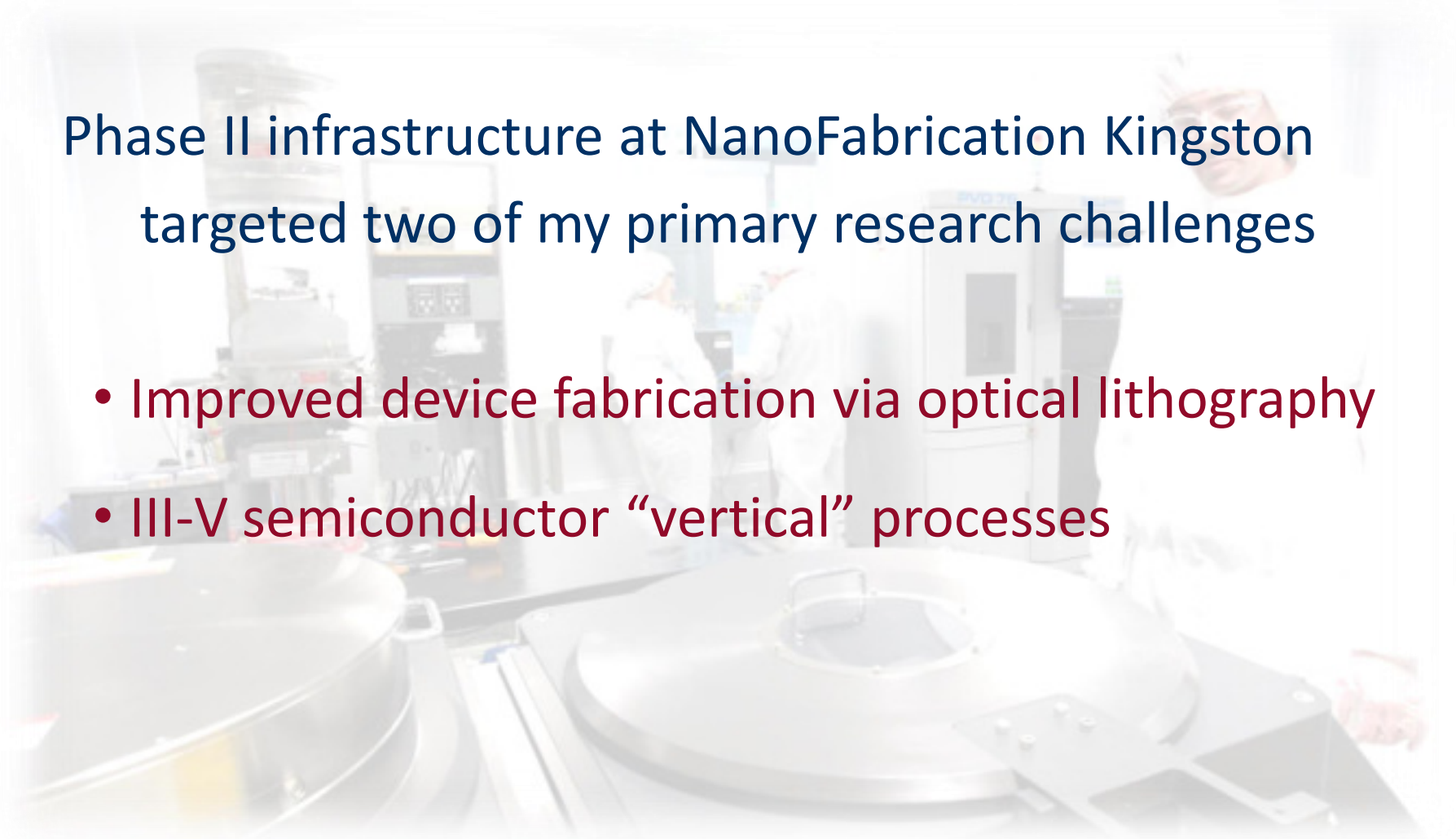


Quantum control in semiconductor structures using Surface Acoustic Waves (SAWs)

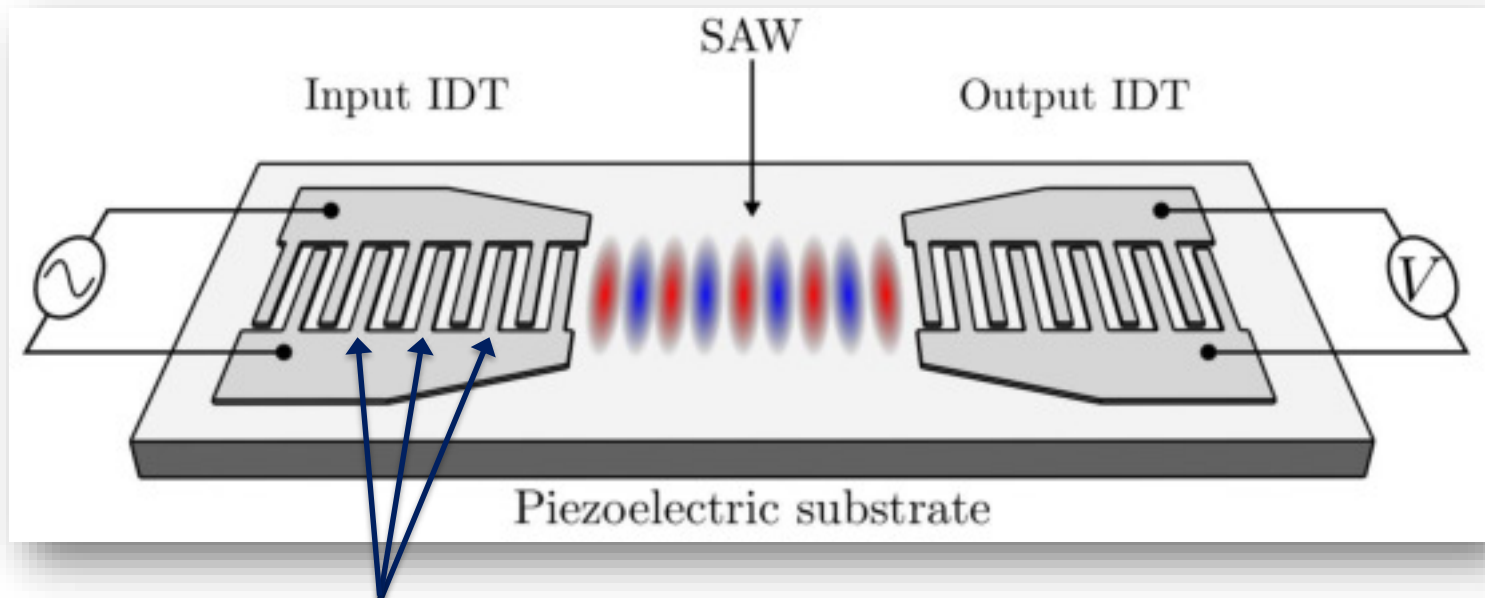


Phase II infrastructure at NanoFabrication Kingston targeted two of my primary research challenges

- Improved device fabrication via optical lithography
- III-V semiconductor “vertical” processes



SAW Device Fabrication



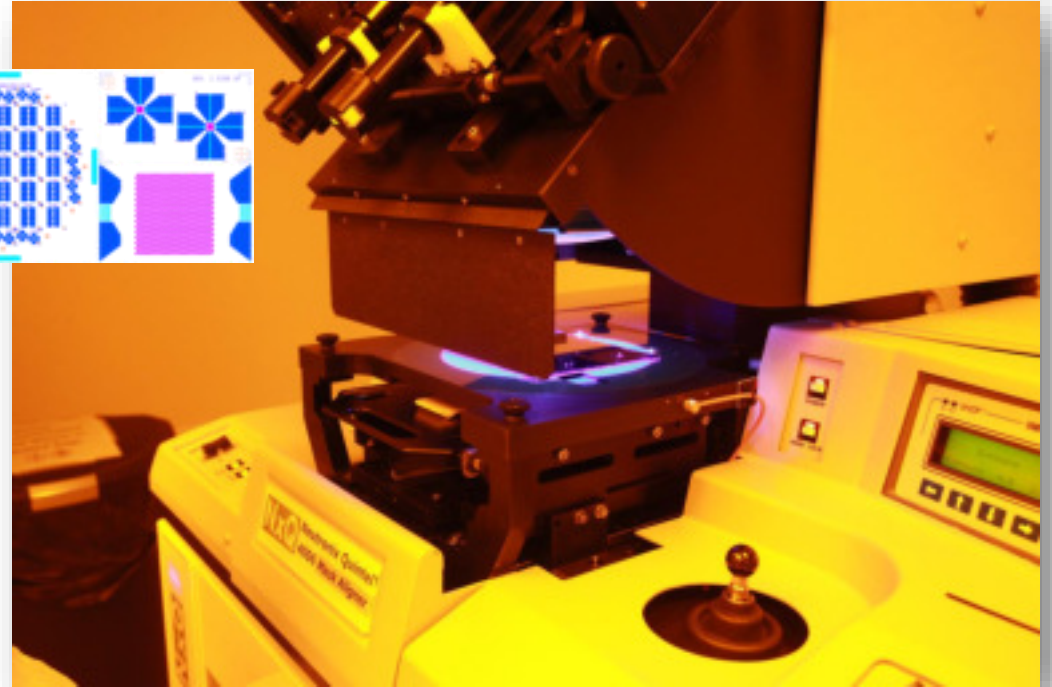
Smaller finger linewidths provide SAWs with

- Higher frequency
- Smaller spatial extent on quantum structures

SAW Device Fabrication

New Mask Aligner

- Smaller feature sizes
- Better yields
- Improved usability

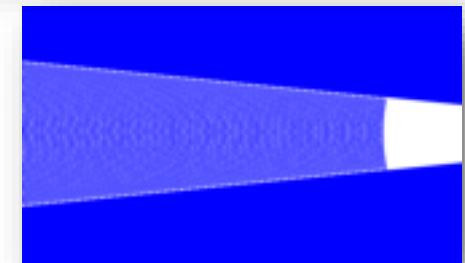


Direct Write (Phase I)

- Small feature sizes
- Device prototyping

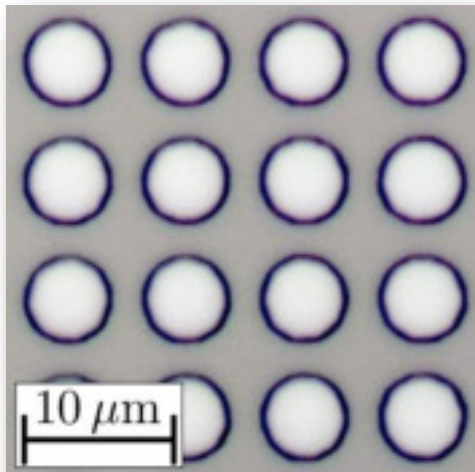


Curved fingers

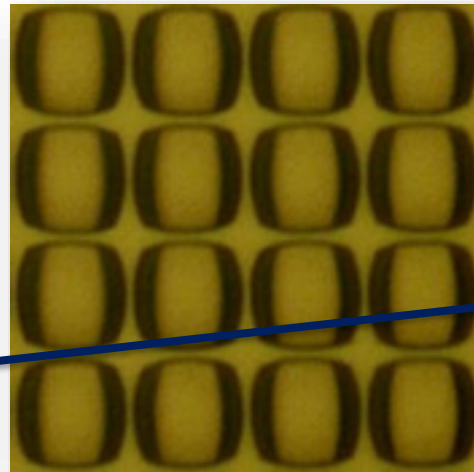


III-V Semiconductor Reactive Ion Etching

Photolithographic
Pattern



Wet/Chemical
Etching GaAs

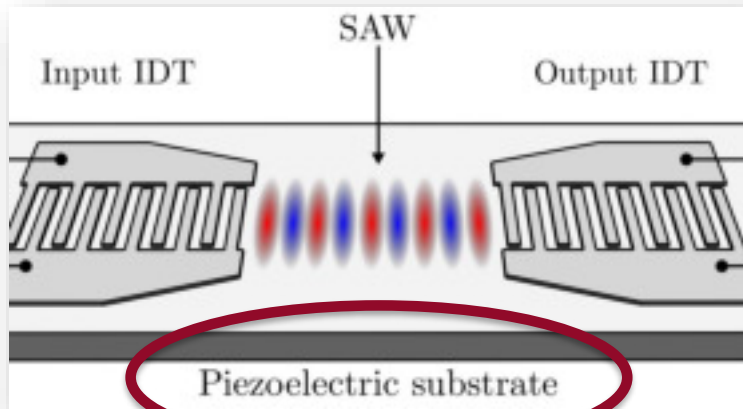


RIE



New Reactive Ion Etching (RIE) tool will enable deeper etching with significantly more uniform sidewalls

Sputtering (RF or DC) Overlayers on III-V Semiconductors



Enables ZnO piezoelectric layers to be sputtered on
III-V semiconductor quantum structures

NanoFabrication Kingston is critical to research program

- Phase II equipment has enabled us to overcome multiple challenges faced in previous years

NFK is open access and local

- Allows students to gain experience in developing new processes / devices

Support from CMC “down the hall”

- More importantly, “in the fab”

