# PC & Tower-TO

## 26.09.2025 update

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# Last Week

- Full capacity RAM installation causes BIOS errors, testing BIOS versions and tuning RAM/CPU settings for compatibility

- Parallel install of Centos 9 and Windows 11

  - Remote access available on Linux via VNC and RustDesk

  - Windows Server 11 unable to install required drivers for latest-generation hardware, not utilizing hardware

  - Delay activating static IP and Ethernet connection via EECS IT service

  - Synopsys tools did not compile on installed Linux version, required specific kernel modifications to function

# This Week

- Parallel install of Centos 9 and Windows 11 complete

  - Remote access available on each operating system via:

    - 1. *Remote Desktop Connection* - Windows

    - 2. *VNC* - Linux

- Synopsys Opto-family installed with license and ready for use, available on both OSes

- AMD and NVIDIA kernel mode (High Performance Compute) drivers installed and verified with tests

- Access (gabor.eecs.berkeley.edu): admin password (remote/in-person): **username** *gabor* **password** *filter*

  - *Use Berkeley VPN for remote access, same as Fermi*

# Next Week

- Arkadev cited reference switch and comb-drive designs to implement

  - **Workflow:**

    - Lumerical (Design and Simulation) ->

    - GDSF/KLayout (Layout and code-defined design) ->

    - Synopsys (GDS and Verification)

- **Milestones:**

  - Single switch design and static ON/OFF simulation in Lumerical by **Tuesday** (with early update for early feedback/verification)

  - Integrate with Tower PDK by EOW to iterate design checks on layout, **Wed/Thurs**

# Conventional Shuttle Switch/Coupler Reference Design



32 × 32 silicon photonic MEMS switch with gap-adjustable directional couplers fabricated in commercial CMOS foundry
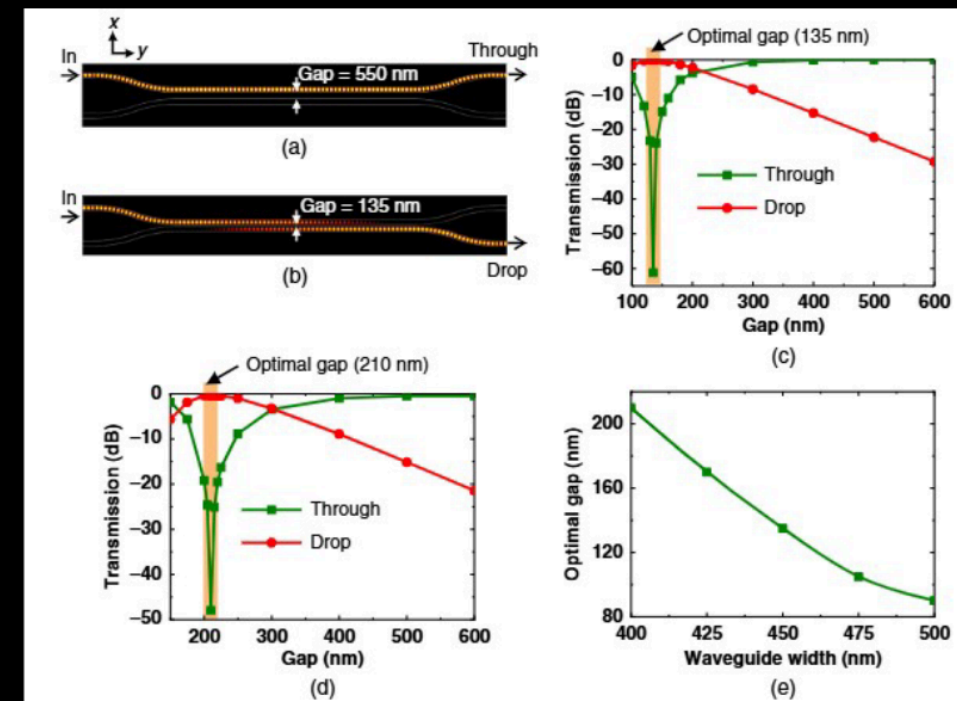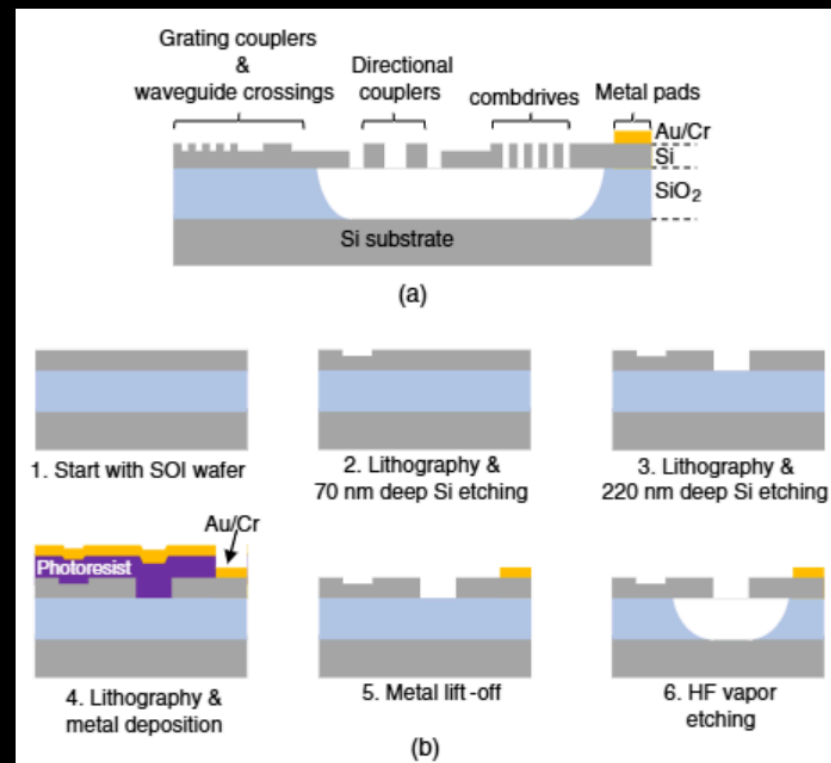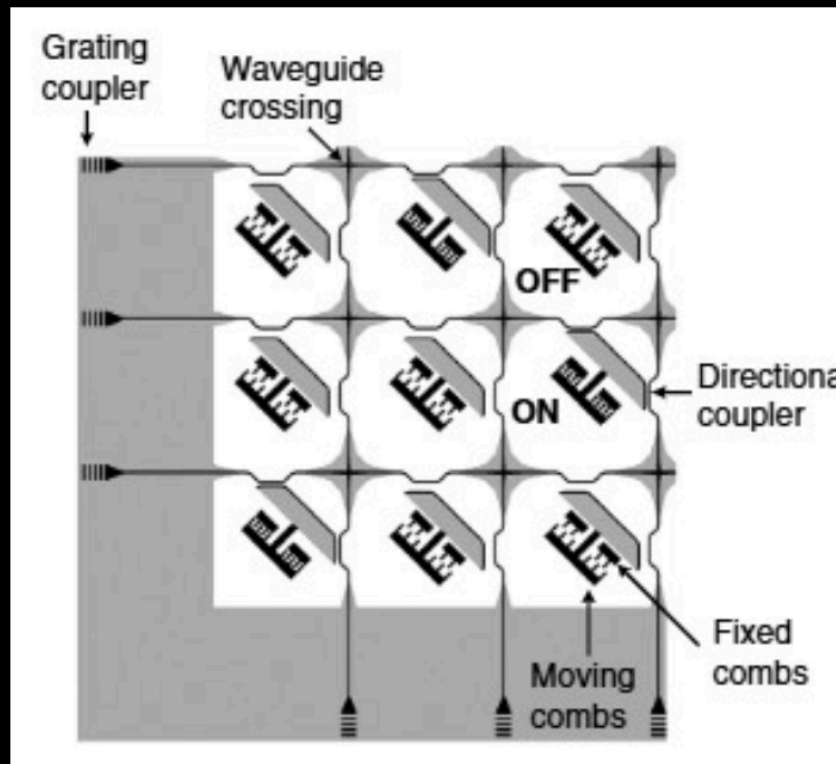
- Reported ~50KHz resonance

- Vdrive ~ 10V

- CMOS compatible, large footprint (~187.5 x 187.5 um per switch)

# Adjustable Switch/Coupler Reference Design

# Silicon photonic microelectromechanical switch using lateral adiabatic waveguide couplers

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- A silicon photonic waveguide switch using adiabatic couplers with lateral comb drive actuators is designed, fabricated, and tested for microelectromechanical optical matrix switch. One of the waveguides of the adiabatic coupler is moved laterally by three actuators for varying the coupler gap, which enables to switch the path of the waveguides. The coupler waveguides with 250 nm thickness consist of a movable tapered waveguide from 400 nm to 500 nm in width and 50 µm in length and a straight waveguide of 400 nm in width. The three actuators are ultra-small electrostatic comb-drive and move the two movable tapered waveguides. The switch's transmission characteristics were measured as a function of the coupler gap. Around a coupler gap of 109 nm, the port isolation of 16.7 dB was obtained. The switch's insertion loss was roughly estimated to be less than 1 dB. The switching time was 36.7 µsec under the present experimental condition. Moreover, 64 switches were arrayed in a 125 µm period square mash waveguide and an 8 x 8 matrix switch was composed. The matrix switch was also tested.
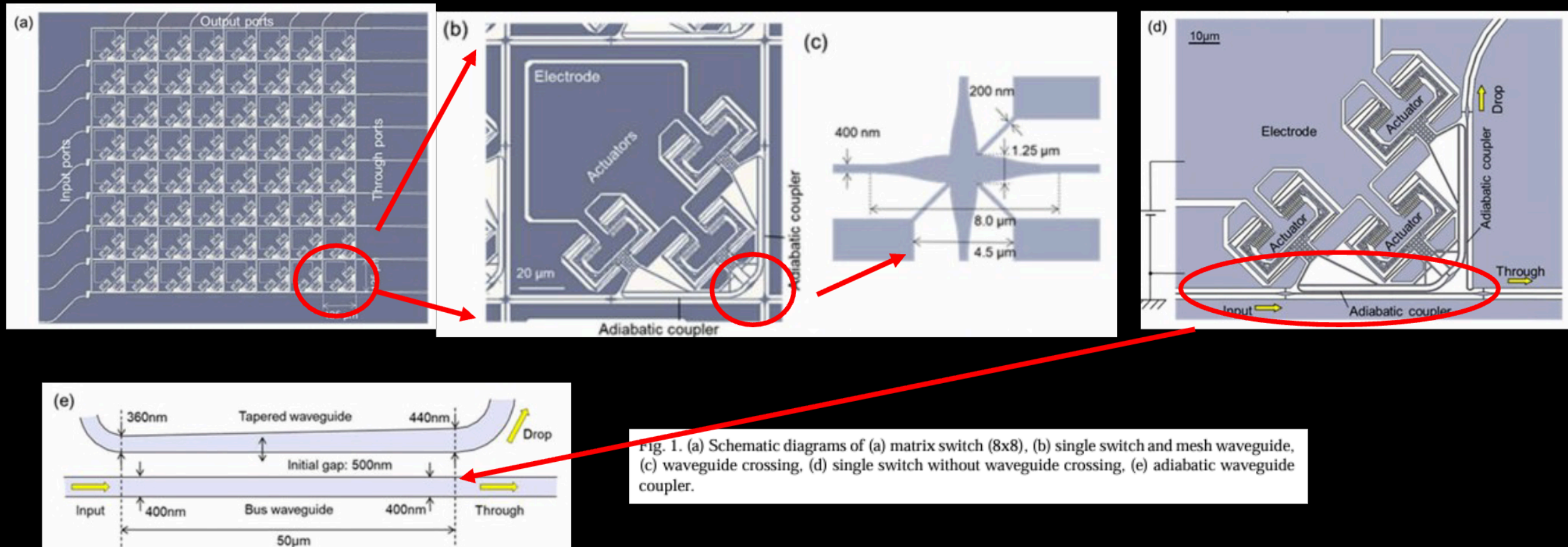
# Top View of Switch Arrays



Fig. 1. (a) Schematic diagrams of (a) matrix switch (8x8), (b) single switch and mesh waveguide, (c) waveguide crossing, (d) single switch without waveguide crossing, (e) adiabatic waveguide coupler.

- Reported ~160KHz resonance

- Higher Vdrive ~ 20V

- CMOS compatible, (.125 x .125 mm per switch)

# Arkadev's suggestion for CD-implementation
# Comb Drive Reference Design
## Si Photonic MEMS Phase Shifter, Glyfason 2021
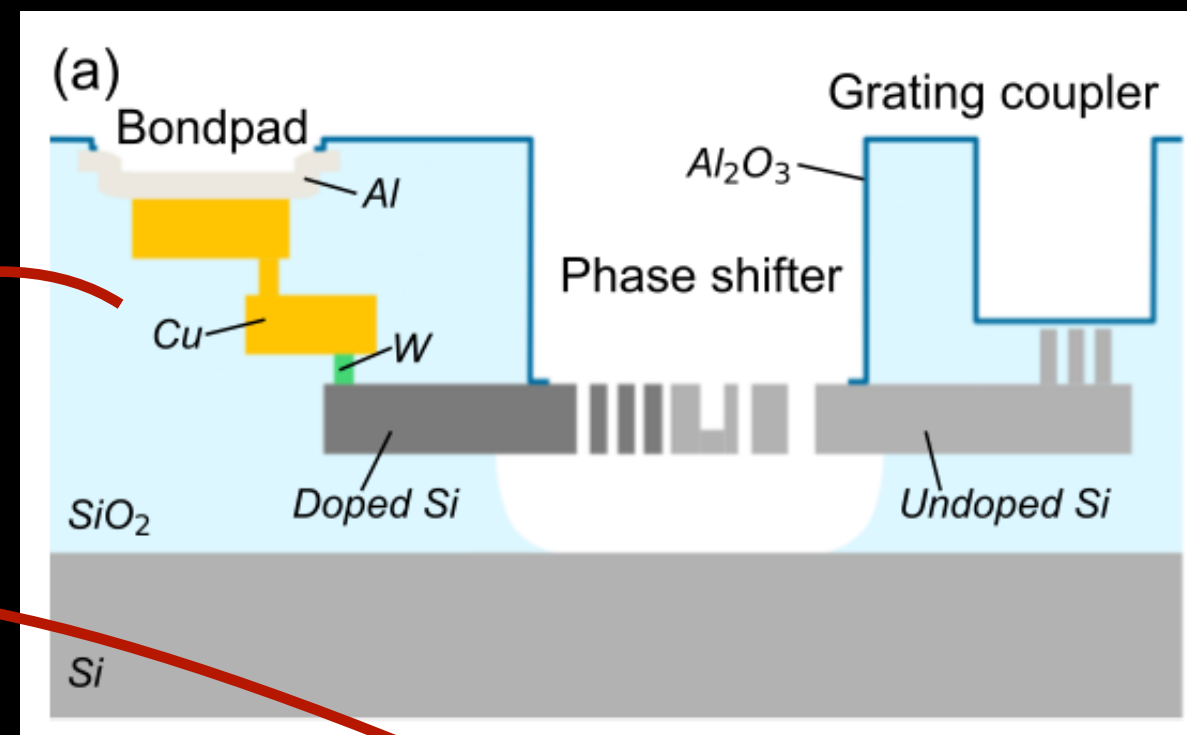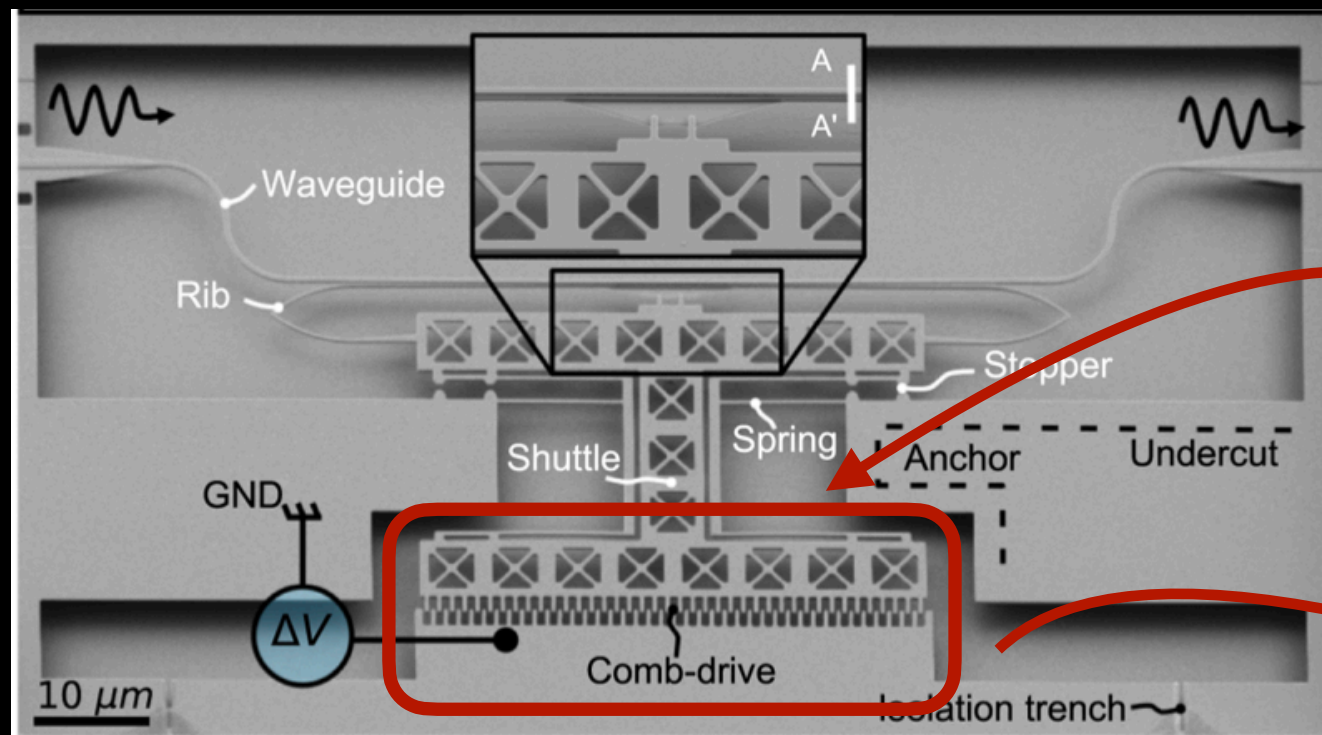


- Reported 500KHz resonance

- Vdrive ~ 10V

- CMOS compat. (100 x 45 um)