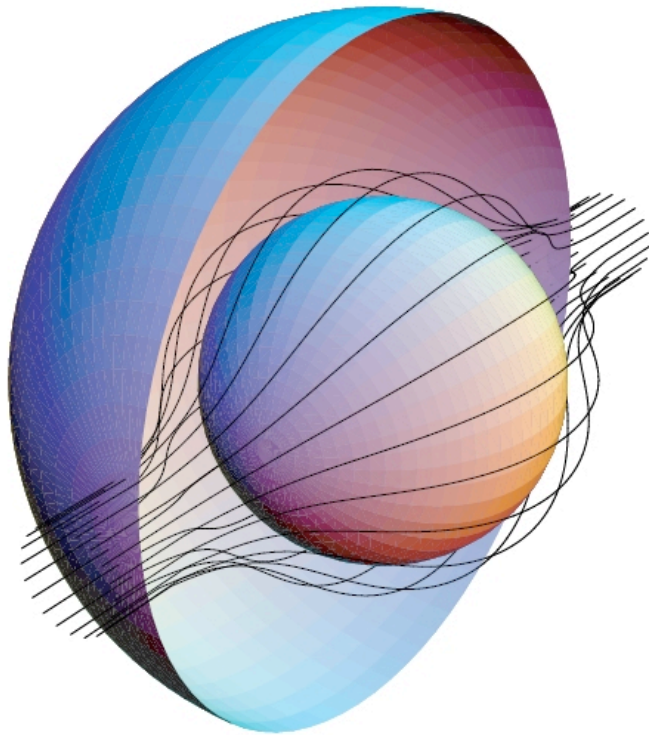


Photonics and “integrated adaptive optics”

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Outline



- What is photonics anyway?
- Photonics drivers
- An example: integrated optics AO
- Issues and questions
- Next steps

What is photonics anyway?

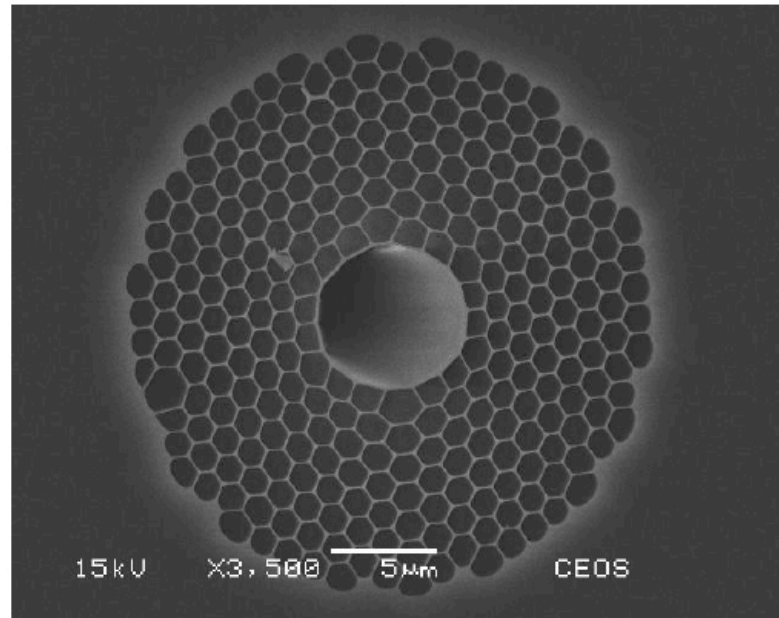


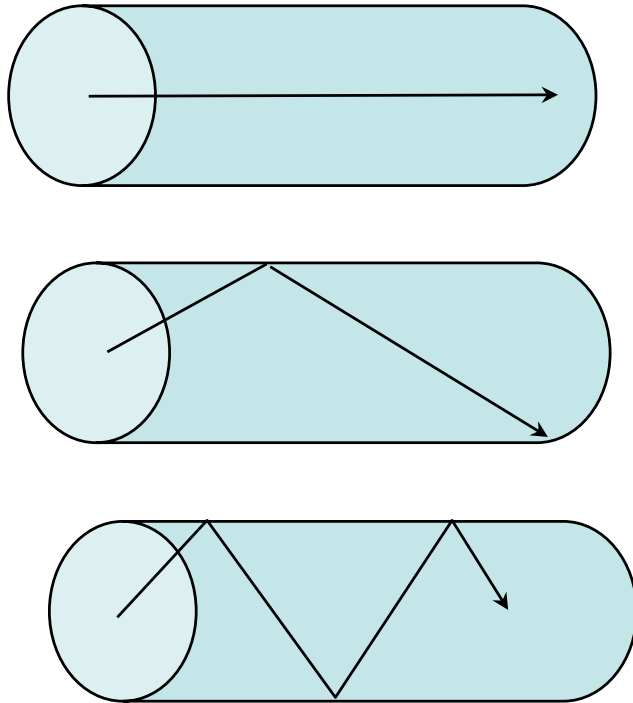


Fig. 1. SEM of one of our test fibers.

- Is photonics  optics, or
- is optics  photonics?
- Comms
- ...switching, multiplexing, buffering
- Sensors
- ...T, P, strain, acceleration, chemicals

Photonics drivers



- Comms=fibers and “integrated optics”
- Lots of light
- Tiny bandwidth
- Single mode
- Small, cheap, simple, low power...

Photonics drivers

- A switch is bread and butter photonics
- Mach-Zhender inteferometer
- plus π phase shift
- Applications of these principles in interferometry...

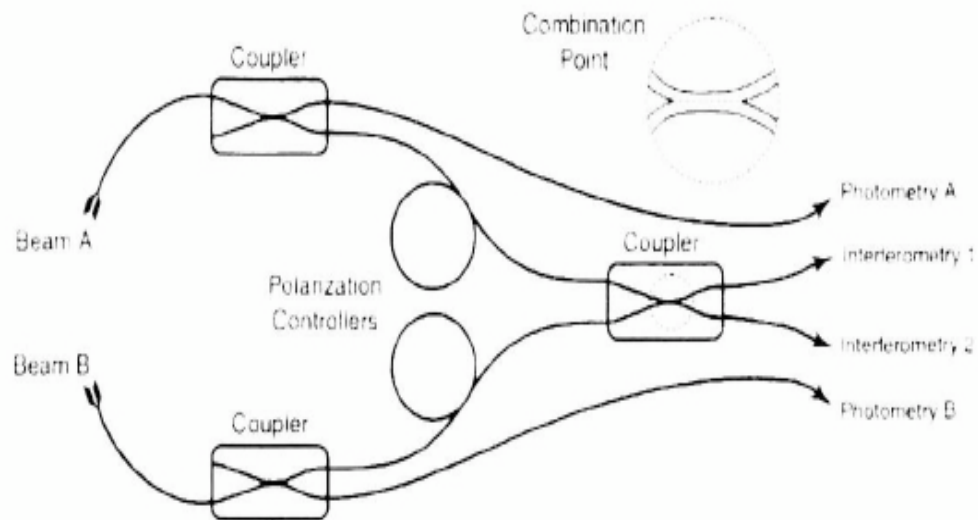
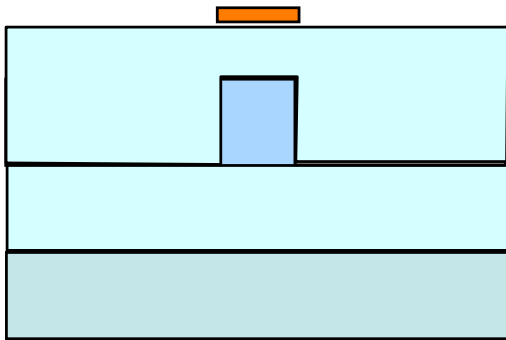


Figure 3. Principle of the MONA beam combiner

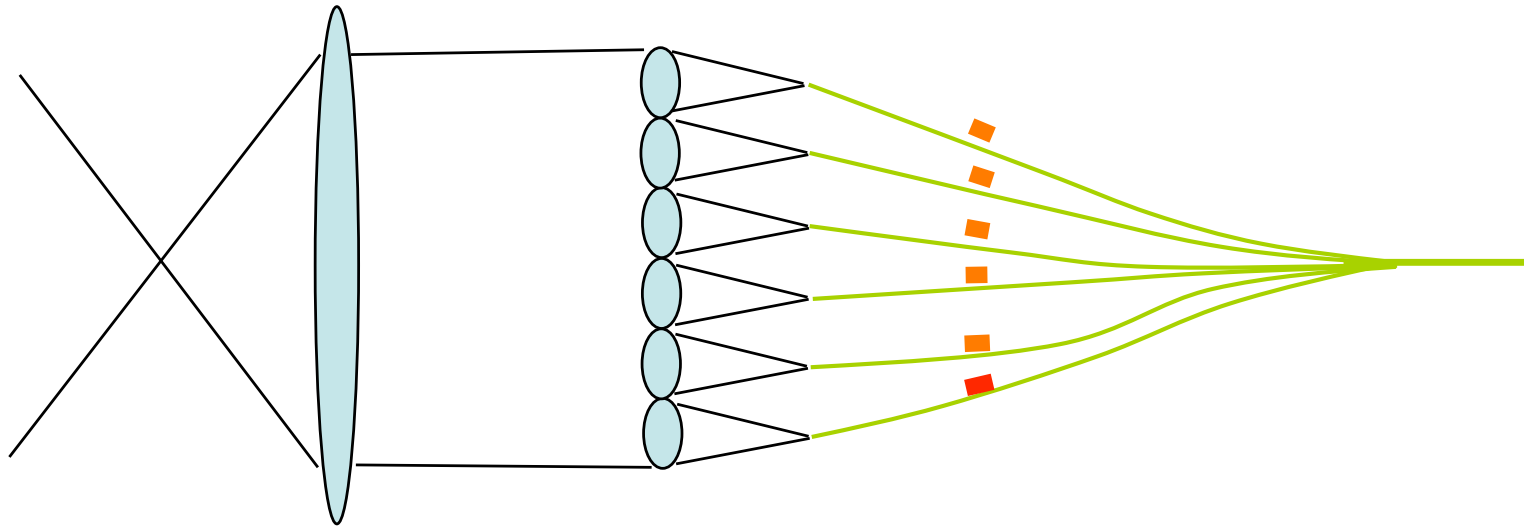
Figure

Photonics drivers

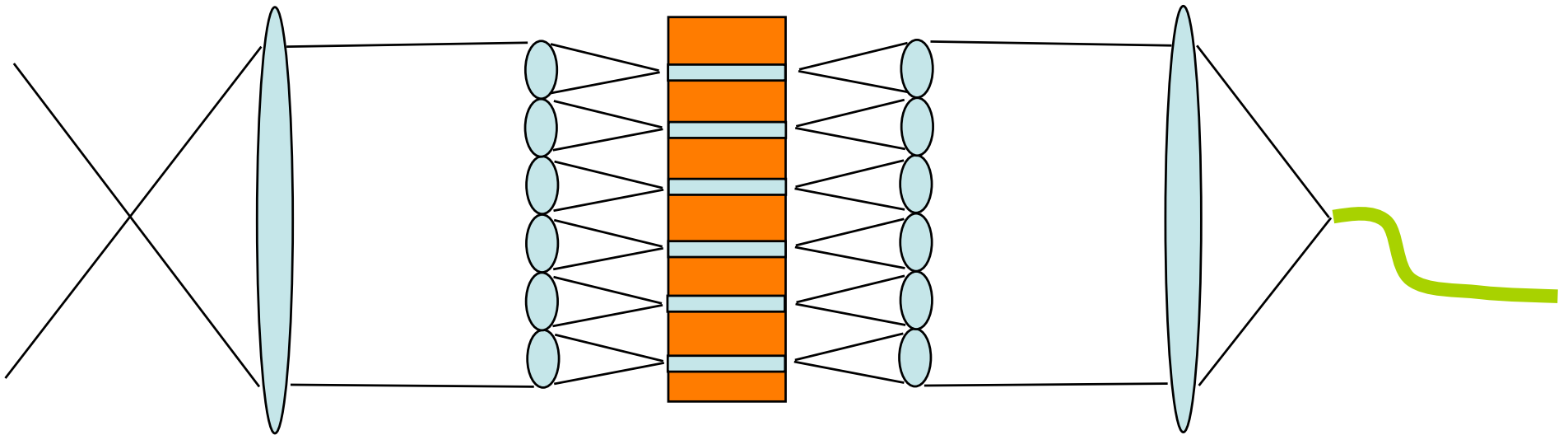


- Controlling *phase* is a key technology for photonics
- Integrated with fiber transport
- Low power, simple, fast, wide band...
- Numerous patents since the 80s and continuing

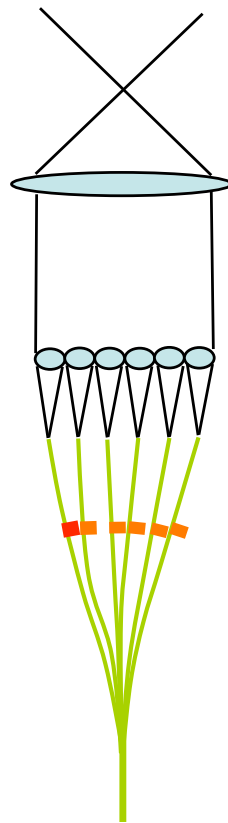
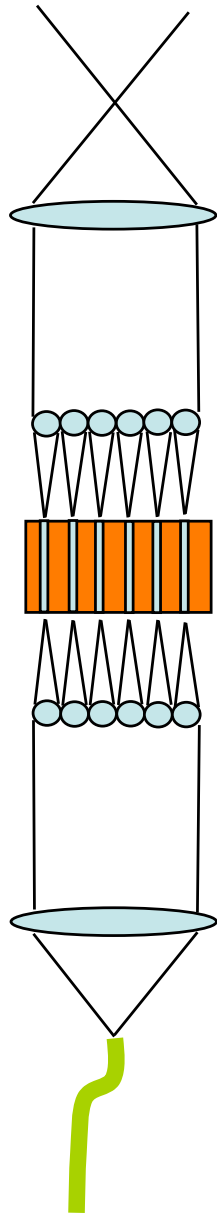
Integrated optics AO



Integrated optics AO

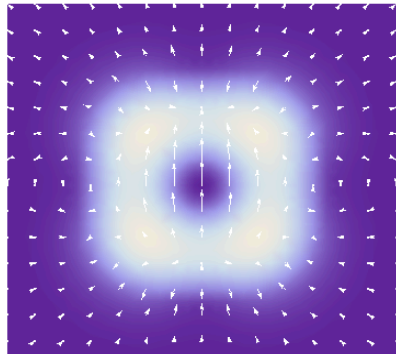
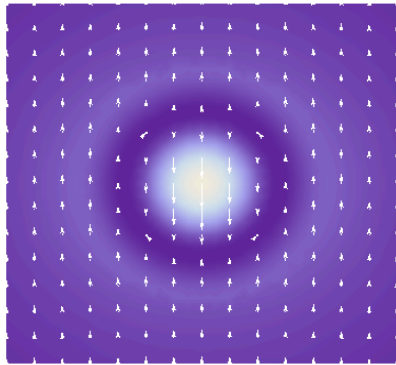
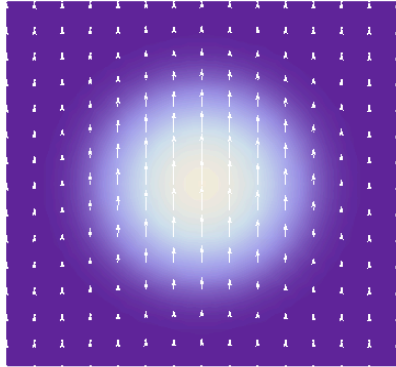


Integrated optics AO



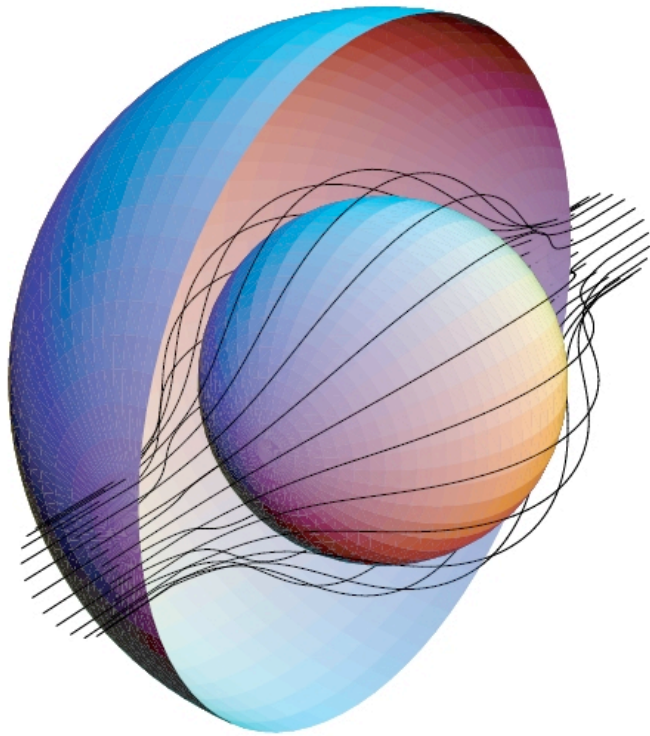
- Compact
- Integrates naturally with other IO components
- Low power
- No moving parts
- Easy exit from focal plane
- Monolithic / stable
- FOV

Issues and questions



- Coupling lenslet-waveguide and back again
- Time constants
- Materials: emissivity, dispersion
- Actual proximity to existing technology

Next steps



- Collaboration with U. Adelaide fiber group
- Emissivity, throughput of designer fibers
- Detail on thermal, materials properties
- Technology readiness / availability

IOMOAO