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Spotlight on "Development of integrated mode reformatting components for diffraction-limited spectroscopy"

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Spotlight summary:

Photonic dicers bring the light everywhere on a chip and light gets reformatted.

This is indeed what we can do with the laser writing technique developed by D. MacLachlan and co-workers, enabling to build optical waveguides of any size and connect them in a 3D space. In other words we can bring the light wherever we want across a photonic chip. An example? We can take the light out of a large multimode waveguide and dice it in a 3D array of stacked single mode waveguides; then we can deliver the waveguides through the photonic chip or even rearrange all the light-paths in a diffraction limited pseudo-slit waveguide. And if we like, we can also go back to a multimode waveguide, and so forth.

Well beyond the well-known concept of a photonic lantern, here optical modes can be reformatted arbitrarily and many times, because every waveguide transition is adiabatic and low loss. Applications are not limited to astrophotonics and advanced spectrography, but can be envisioned in all the fields where mode manipulation is required, such as in high-capacity optical transmission systems exploiting spatial mode multiplexing.

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