Some New Advances in Slow and Fast Light

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This talk will be posted on my Ottawa website within 24 hours.

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Optics Letters

Photonic crystal slow light waveguides in a kagome lattice

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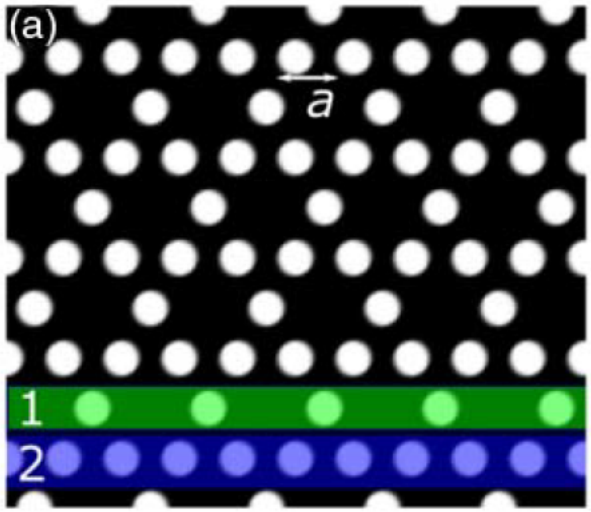
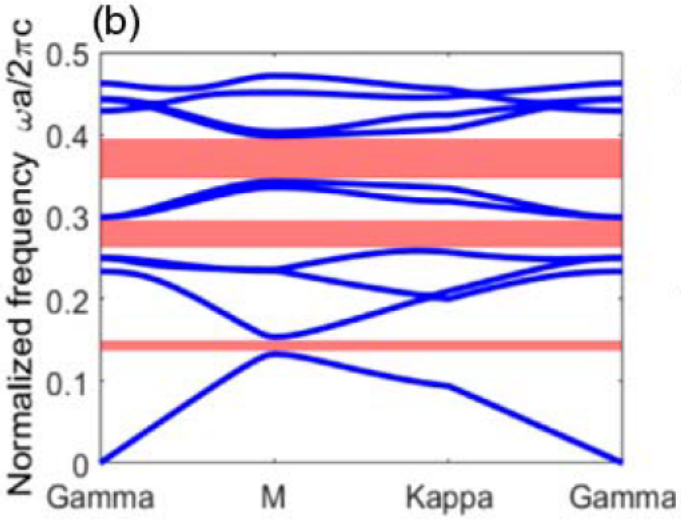
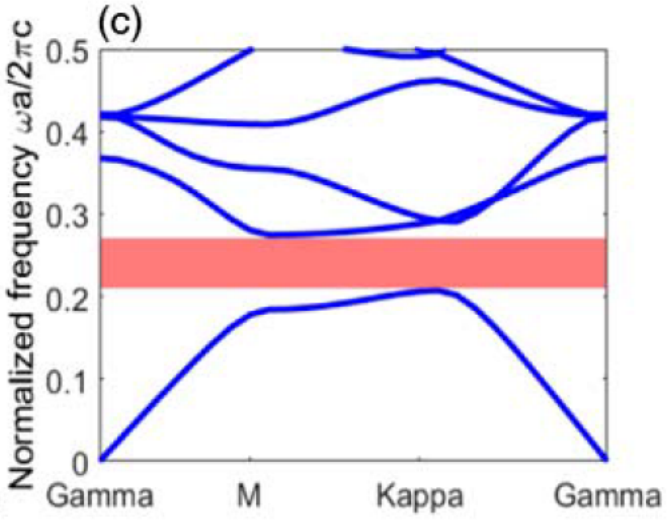
Kagome lattice



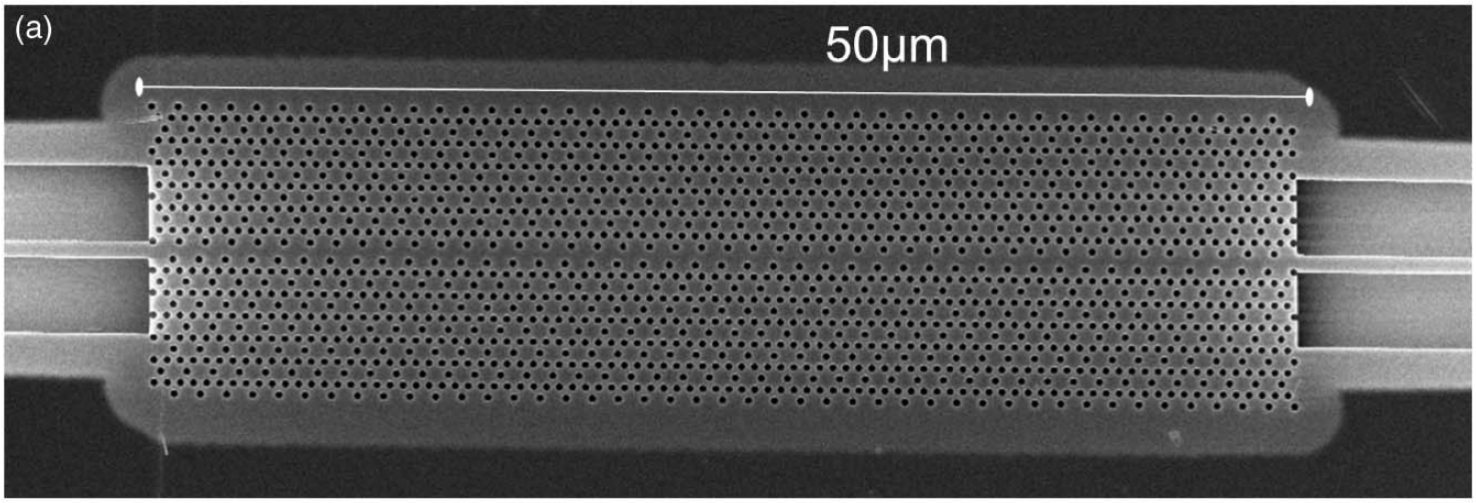
Kagome lattice band structure

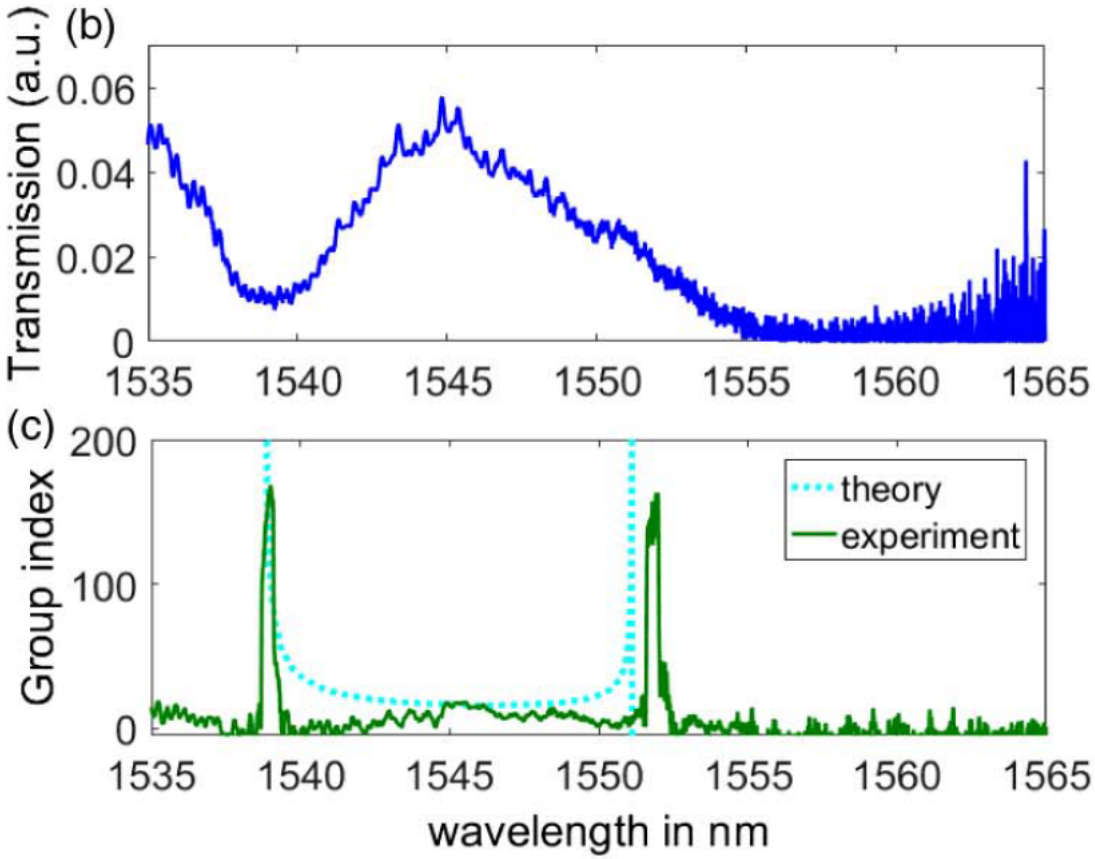


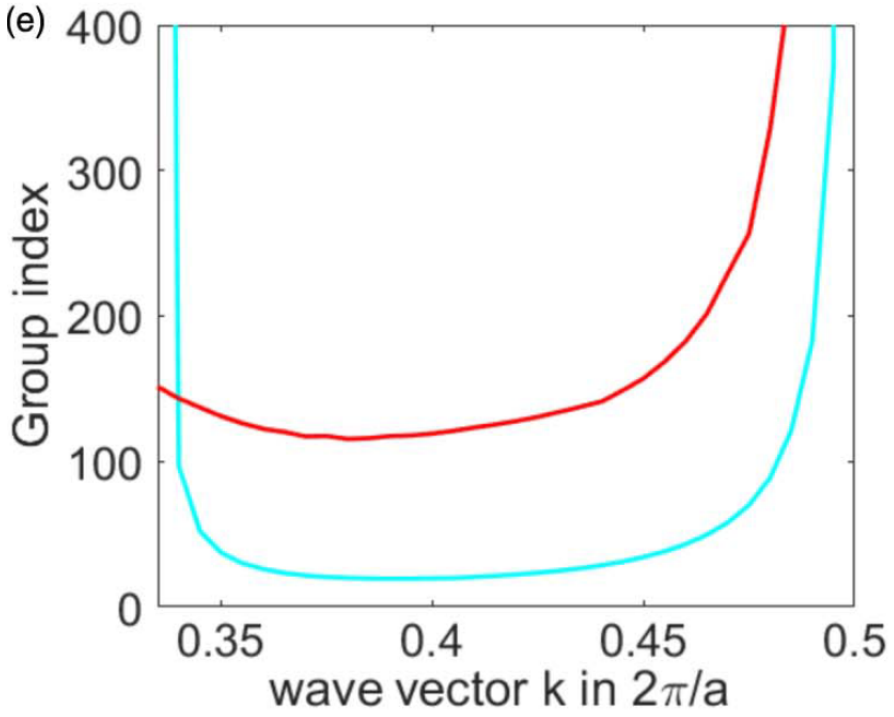
Triangular lattice band structure



Kagome -- Results







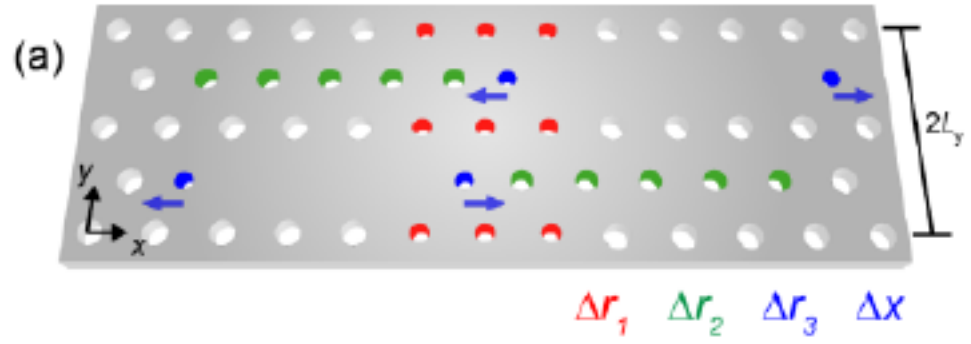
measured group index greater than 150

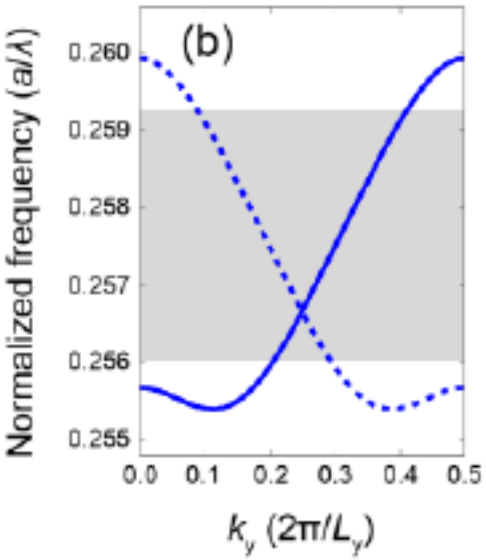
Ultra-wide-band slow light in photonic crystal coupled-cavity waveguides

Yiming Lai[1,2], Mohamed Sabry Mohamed[3], Boshen Gao[4], Momchil Minkov[3], Robert W. Boyd[1], Vincenzo Savona[3], Romuald Houdré[3], and Antonio Badolato[1,2]

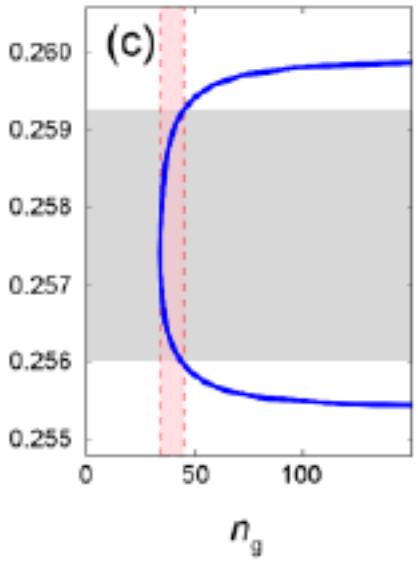
design optimized through genetic algorithm

fabricated device



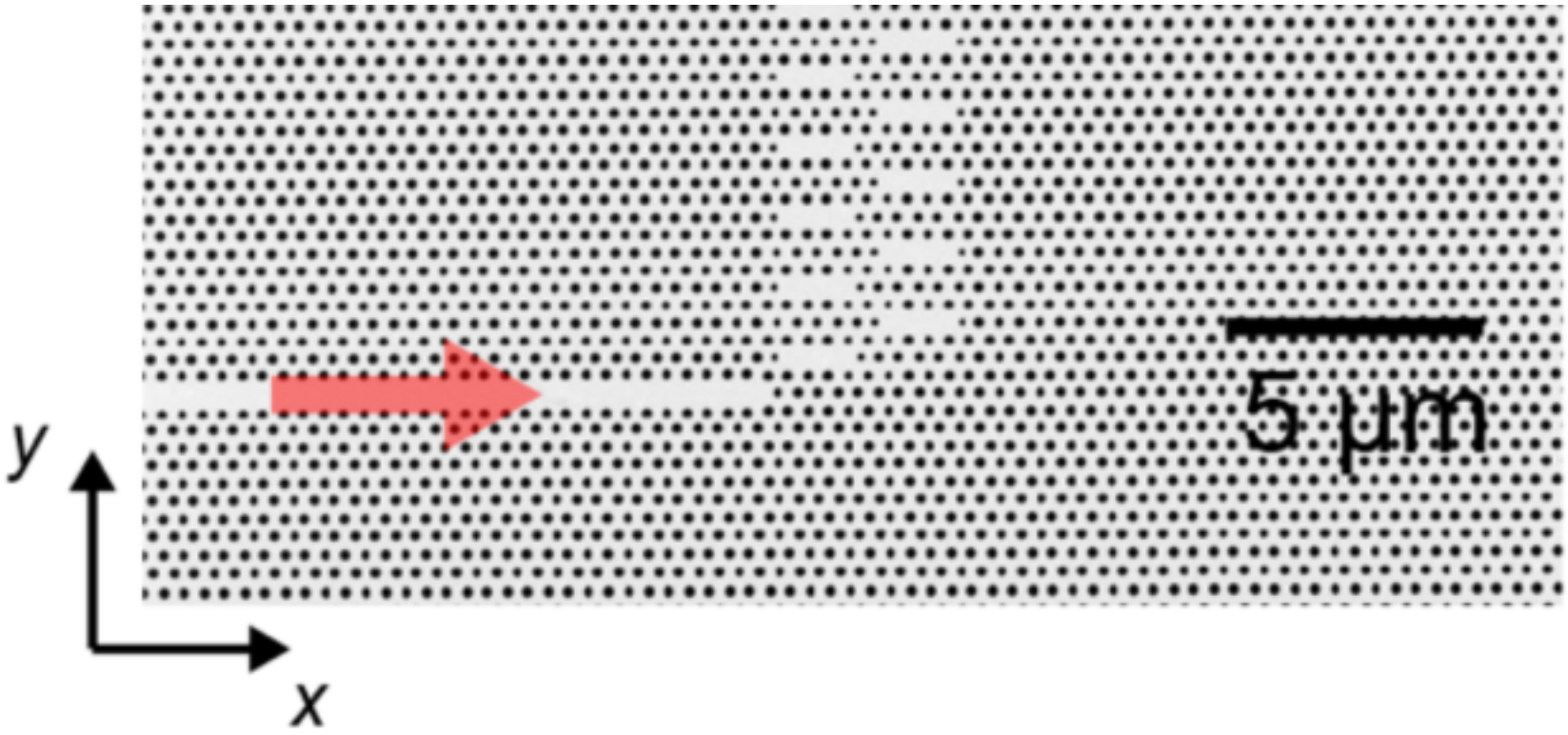


band structure

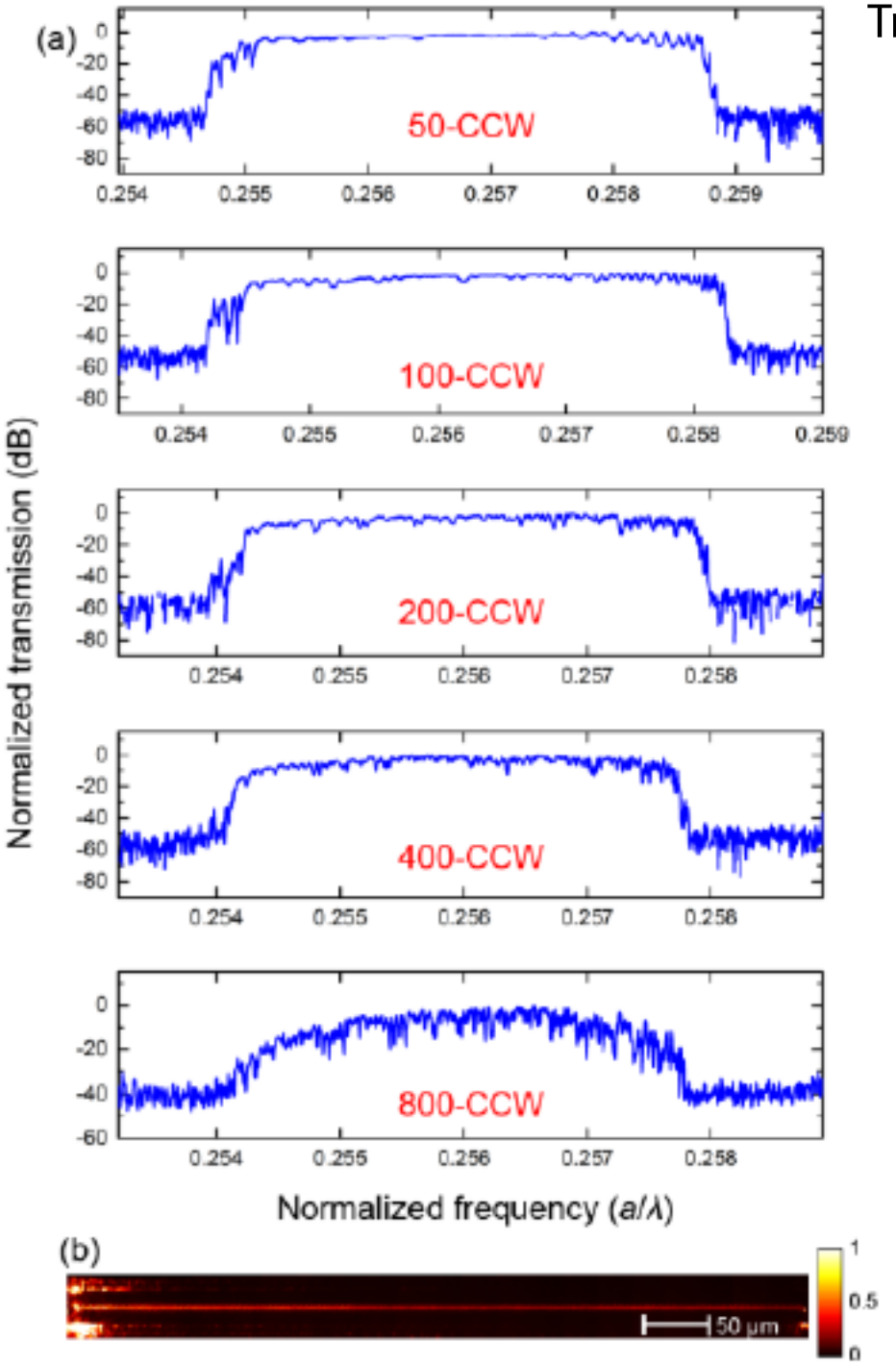


group index

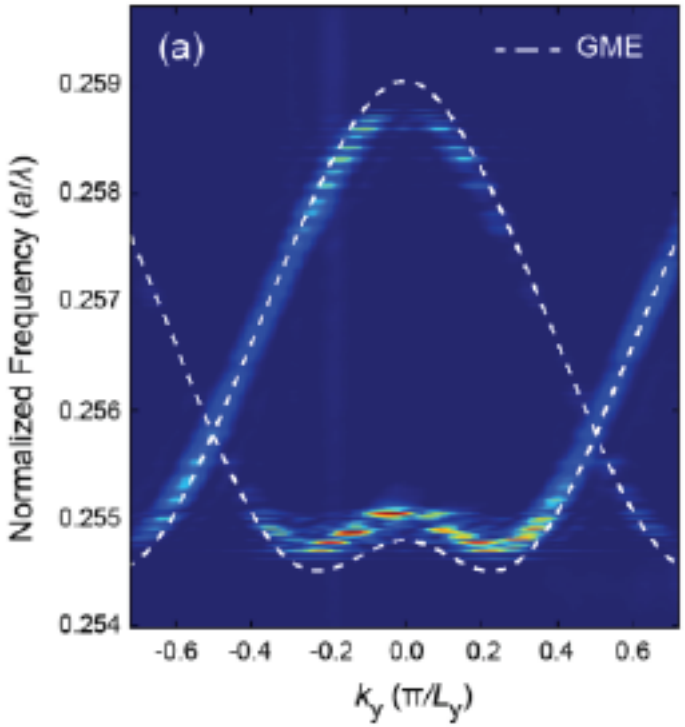
Closeup



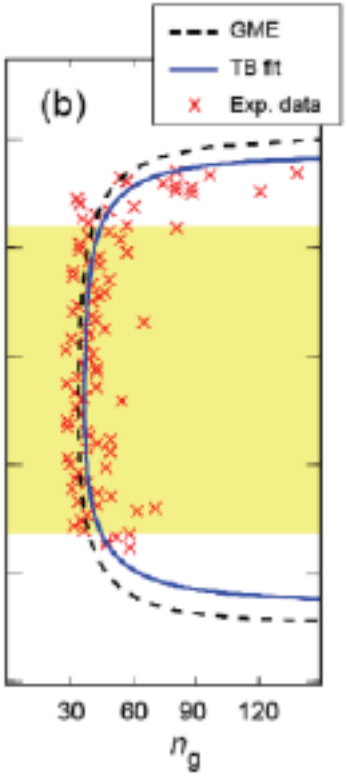
Transmission spectra



Band structure



group index spectrum

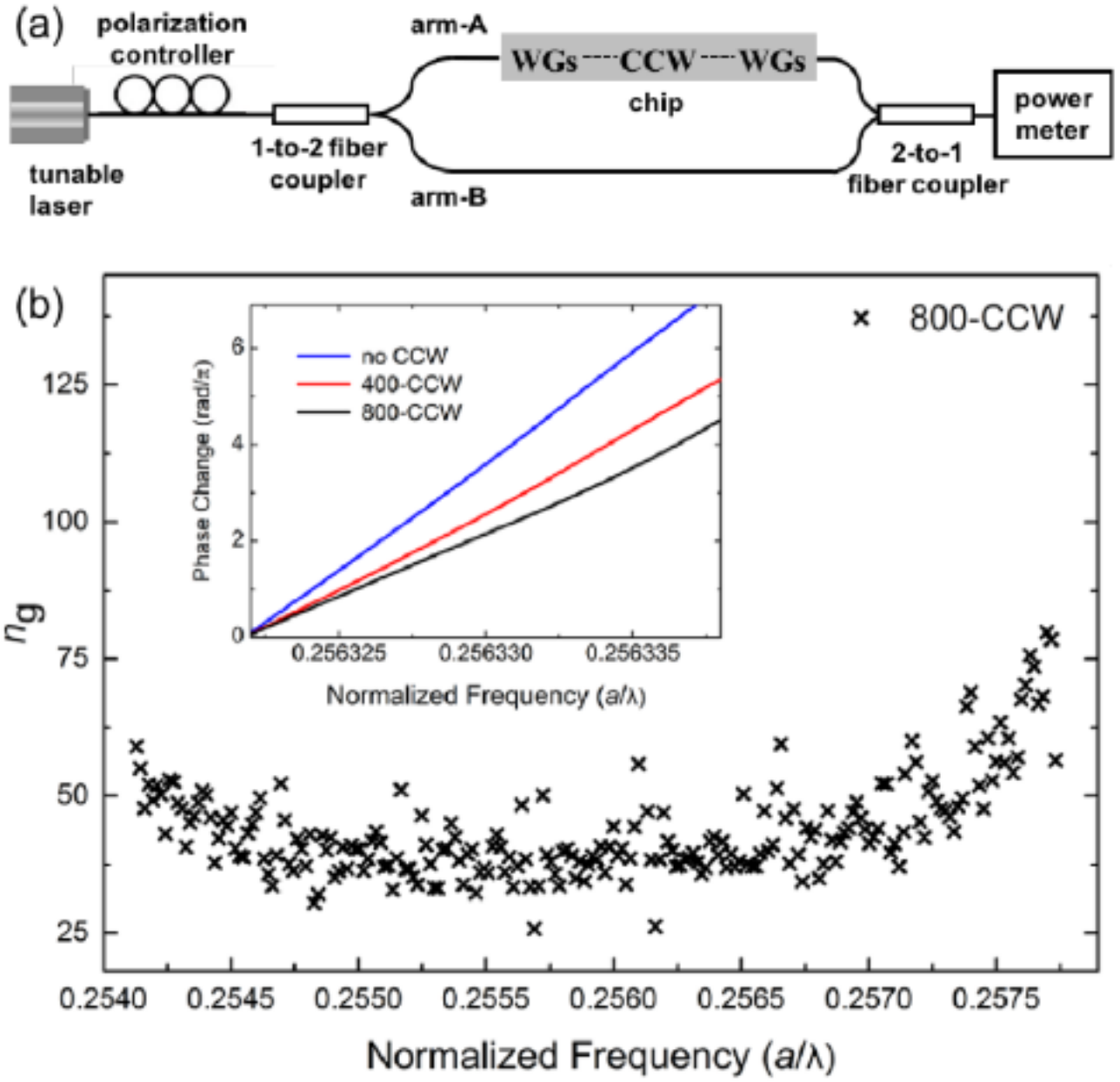


group-index bandwidth product (GBP)

$$\langle n_g \rangle \, \Delta\omega/\omega$$

GBP = 0.47

Confirm Results via Interferometry



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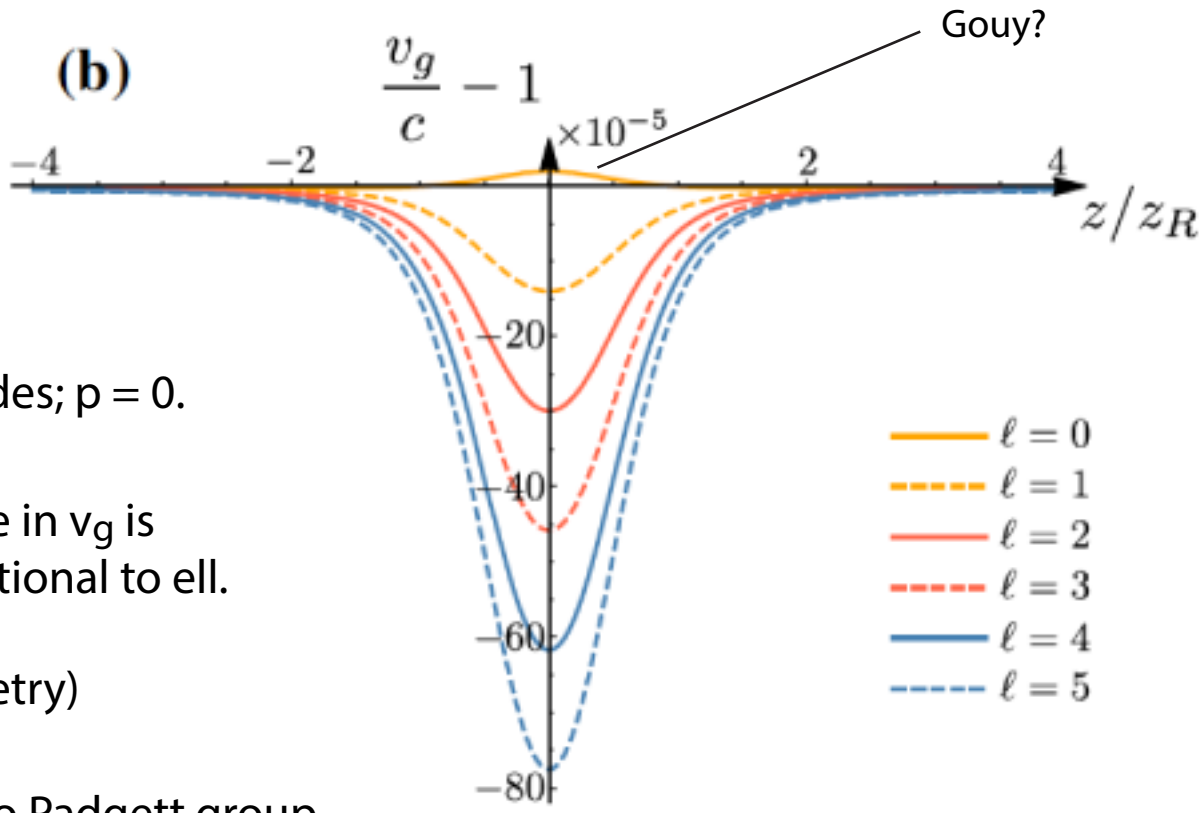
optica

Observation of subluminal twisted light in vacuum

Frédéric Bouchard,[1,2] Jérémie Harris,[1,2] Harjaspreet Mand,[1,2] Robert W. Boyd,[1,2,3] and Ebrahim Karimi[1,2,*]



Gouy?

LG modes; p = 0.

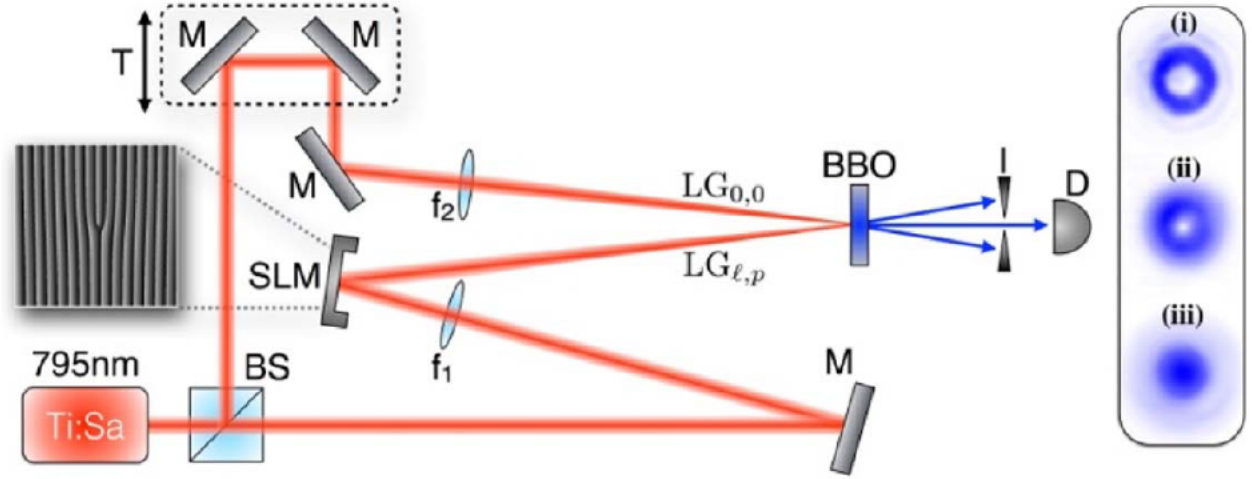
Change in v_g is proportional to ell.

(geometry)

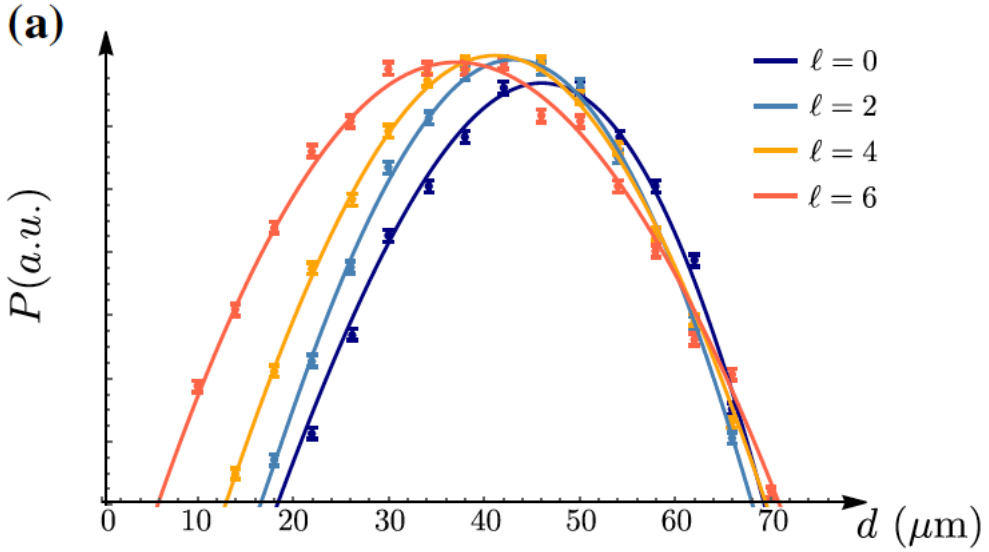
See also Padgett group

Vacuum Slow Light

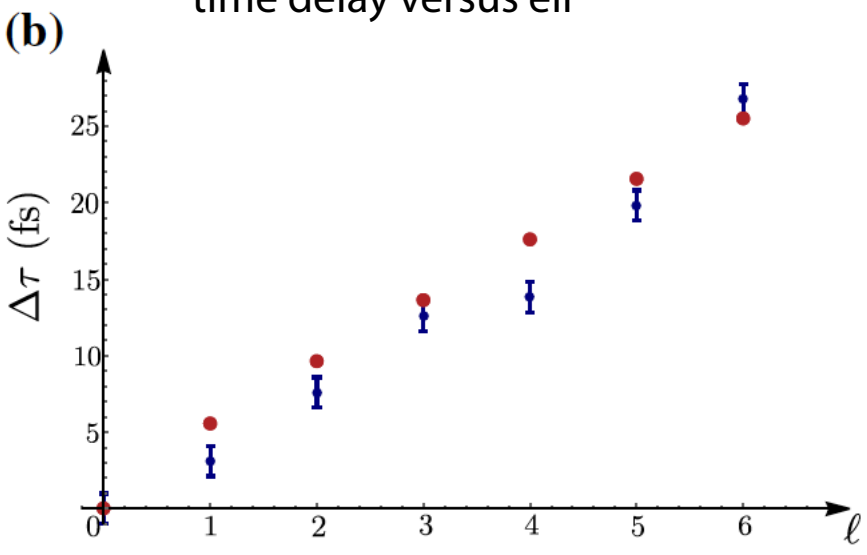
experimental setup



detected power versus mirror displacement



time delay versus ell



Slowly but surely

In 2006, *Nature Physics* published a paper reporting a Stern–Gerlach effect for dark polaritons and one revealing the existence of slow-light solitons. Both of these papers have significantly advanced the field of slow-light research.

Ebrahim Karimi and Robert W. Boyd