

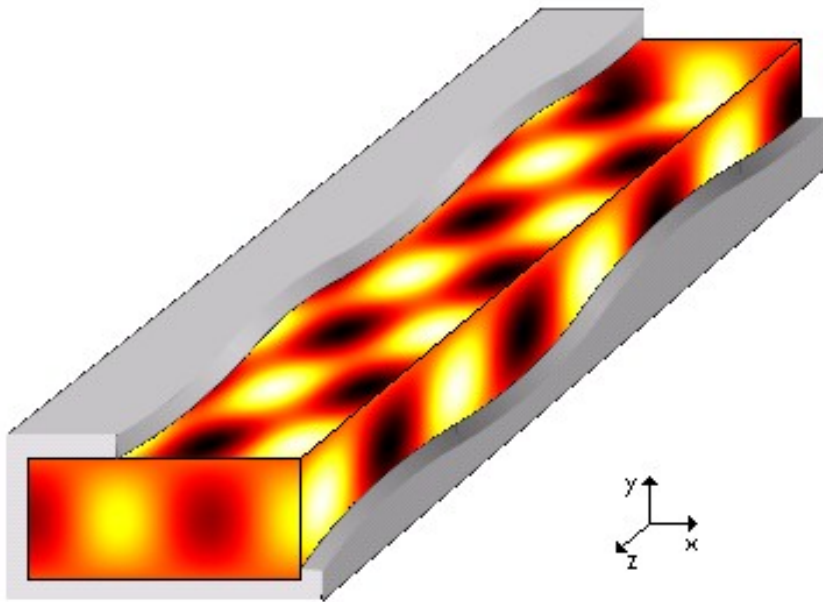
Tunable graphene nanoribbon Bragg reflector

summarized and presented by

Edmund Merrow-Smith

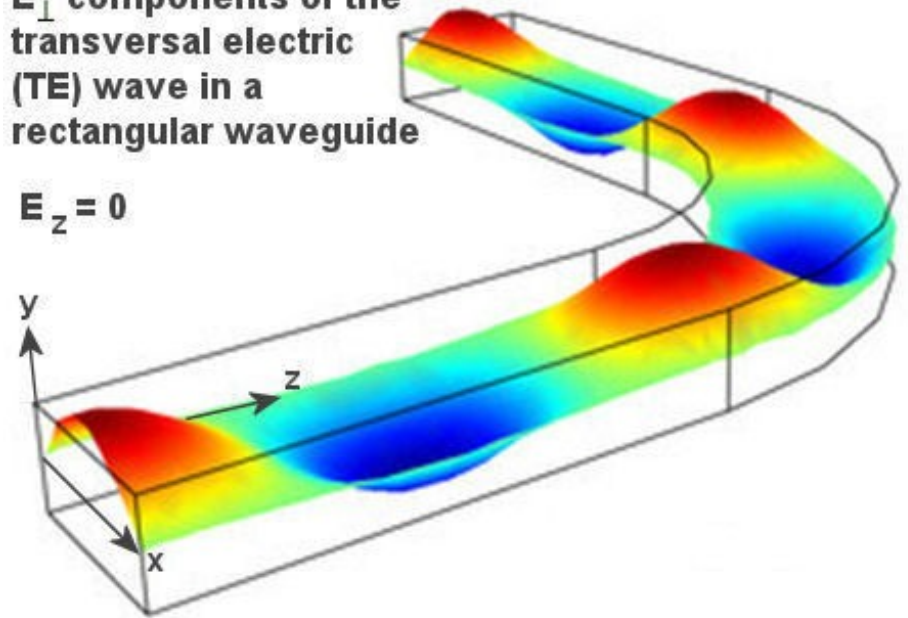
551192@swan.ac.uk

Waveguides

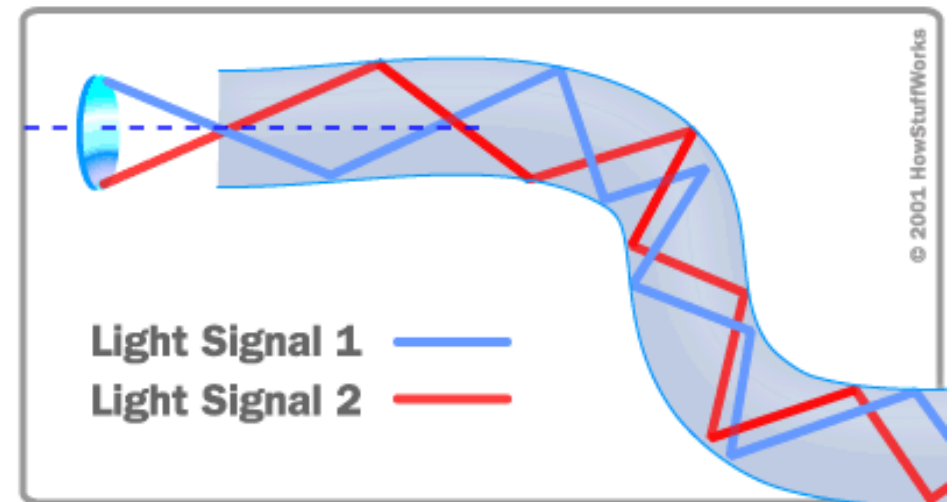
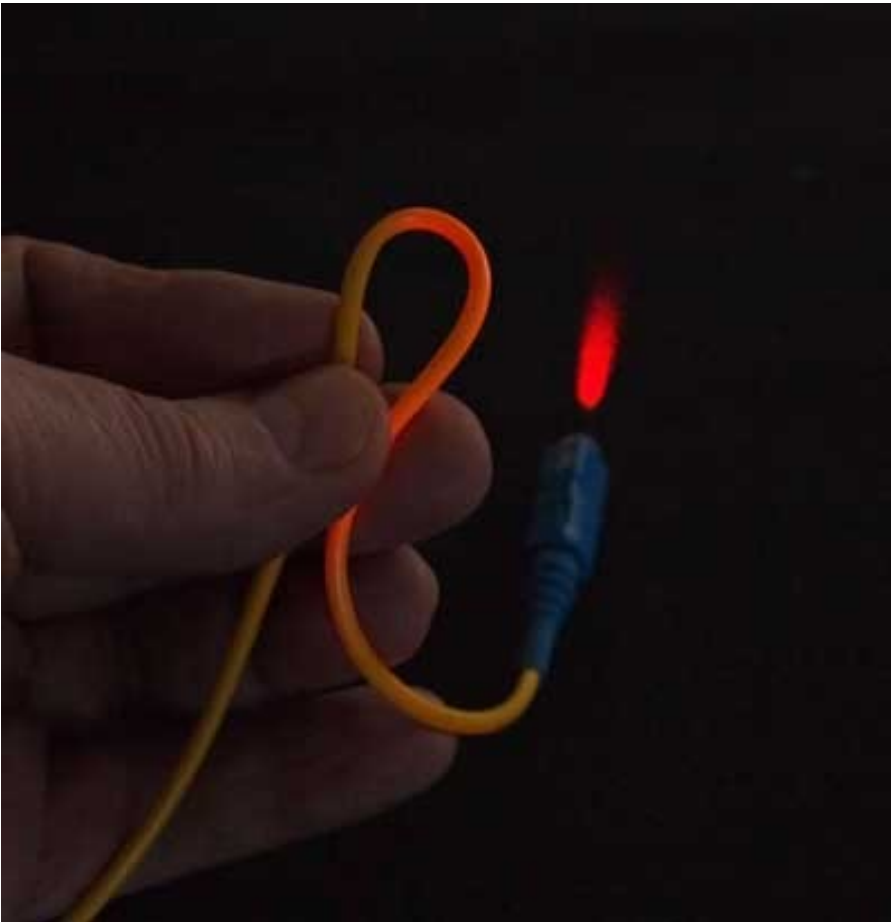


E_{\perp} components of the
transversal electric
(TE) wave in a
rectangular waveguide

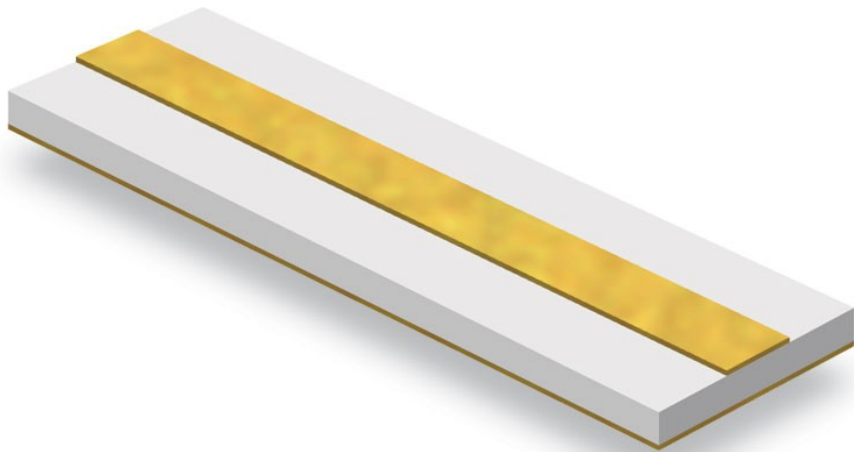
$$E_z = 0$$



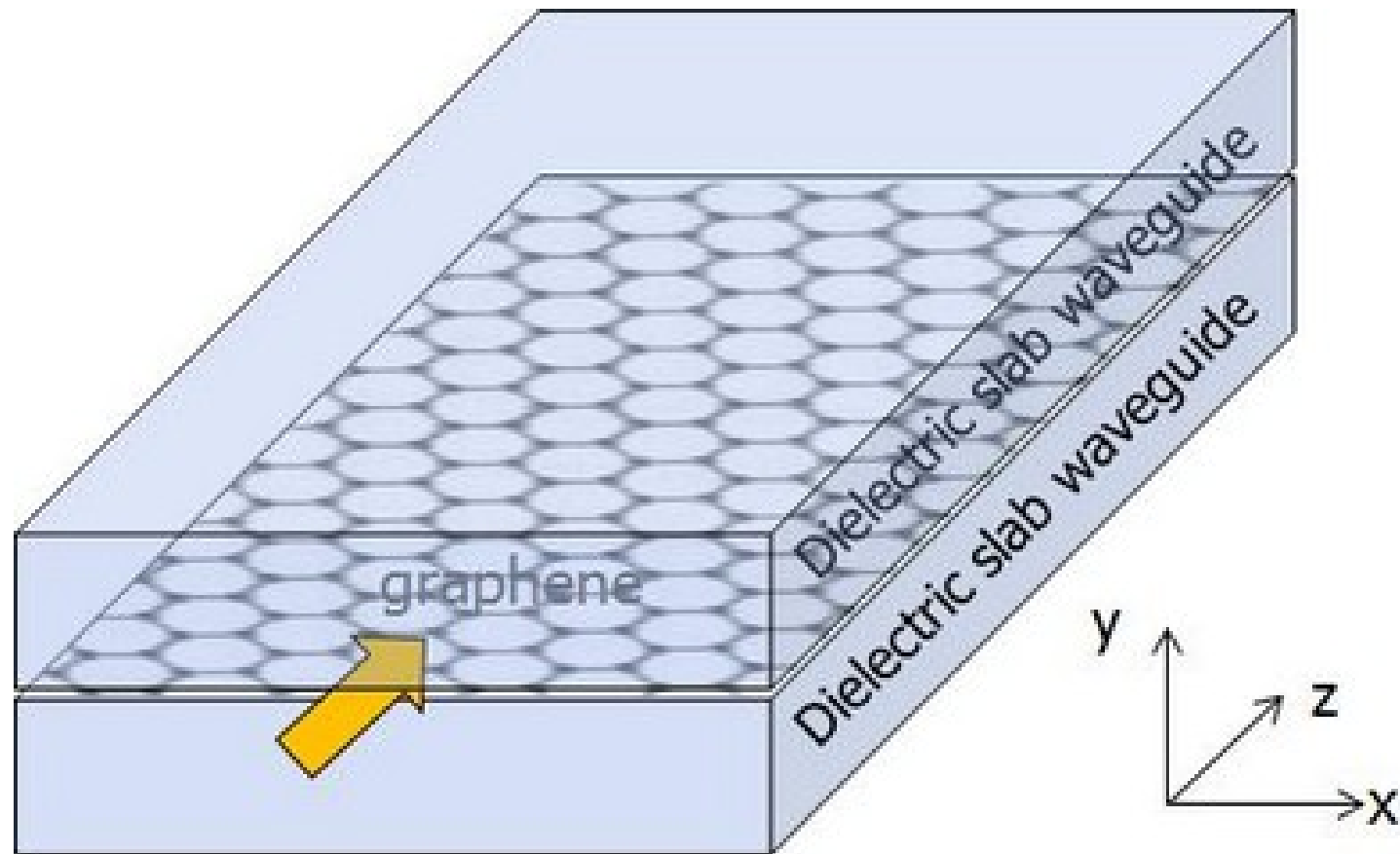
Fibre Optic Cables



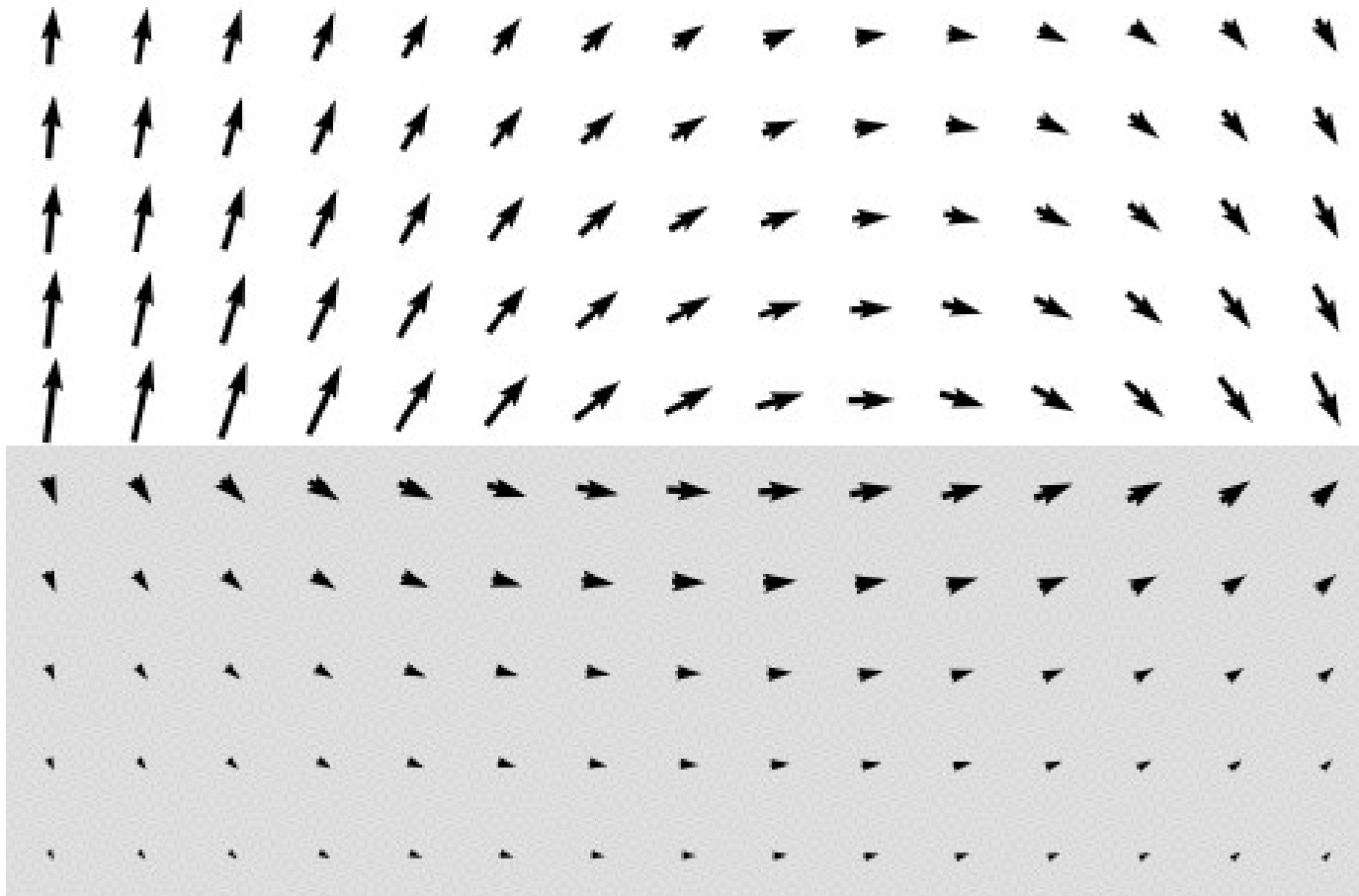
Microstrip waveguide - EM waveguide



Graphene ribbon waveguide

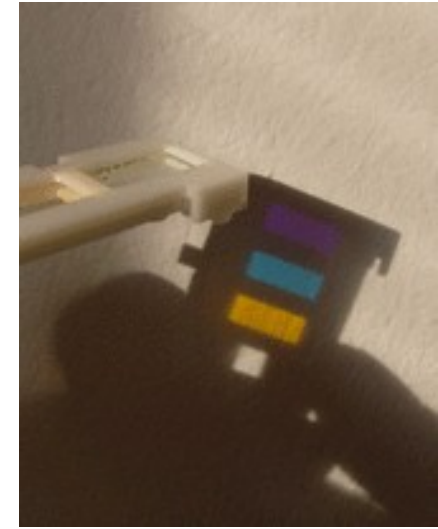
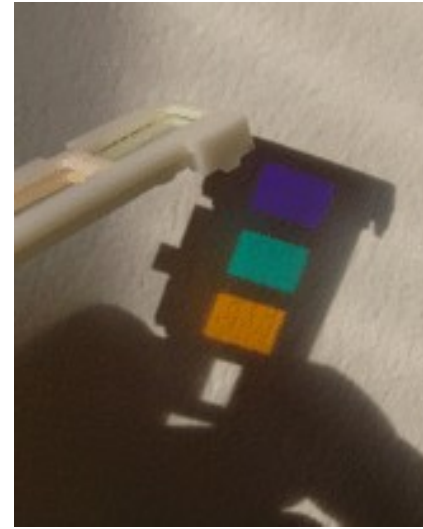
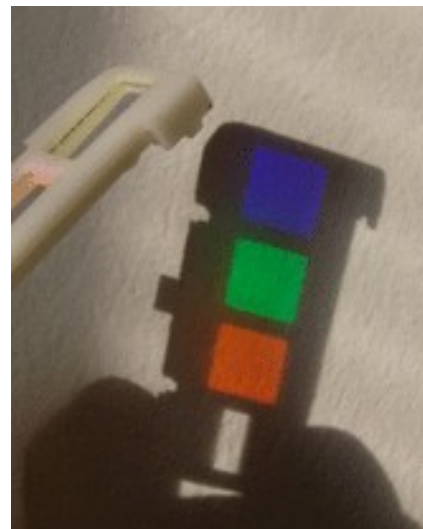
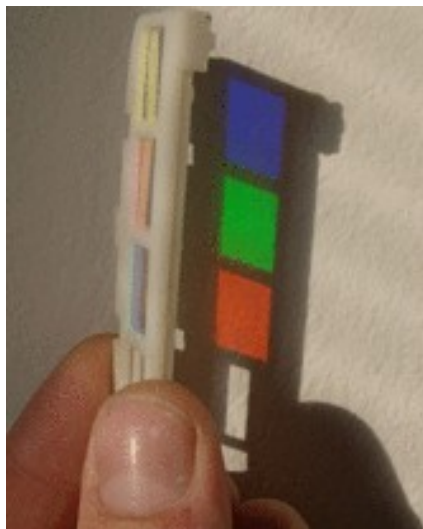
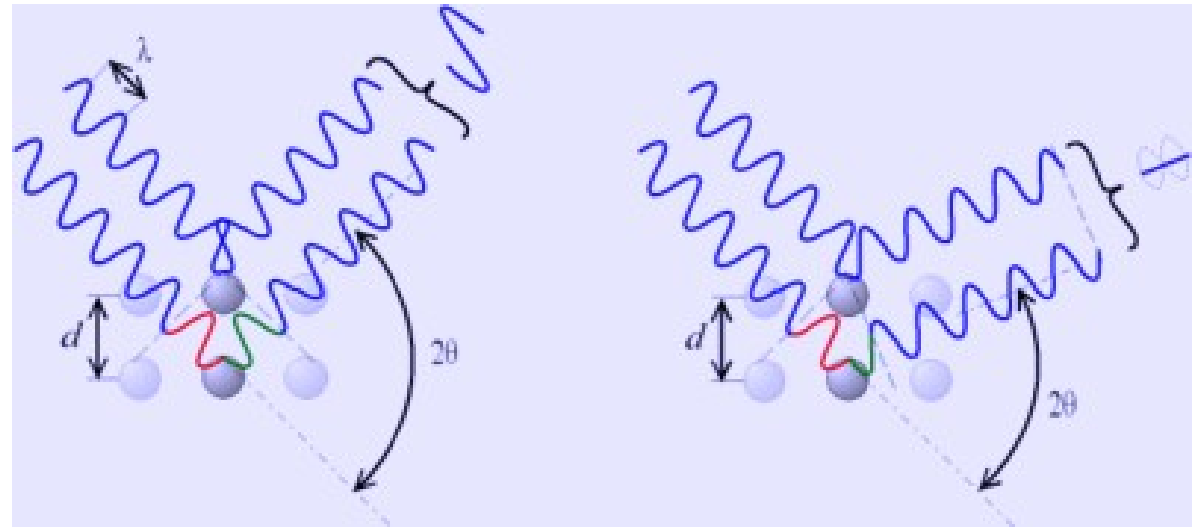


Surface Plasmon Polaritons

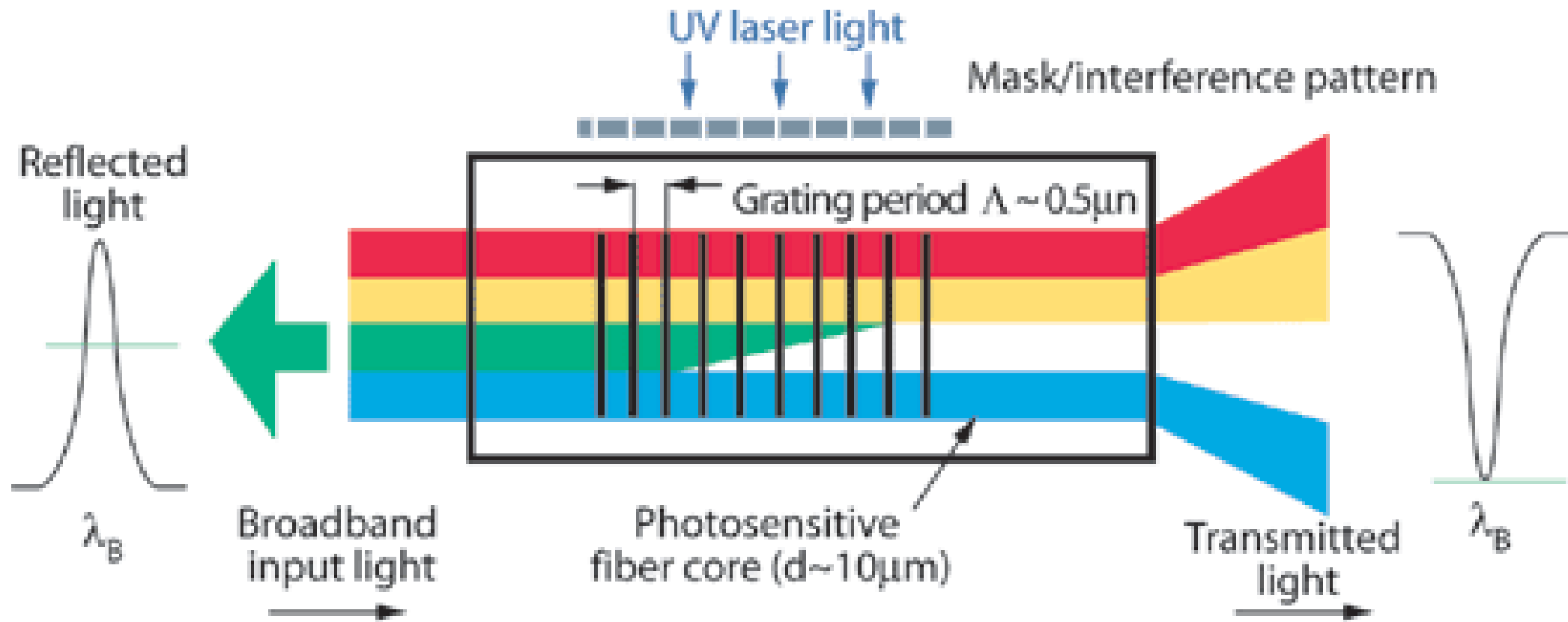


Tunable graphene nanoribbon Bragg reflector

Bragg's Law $n \lambda = 2 d \sin \theta$

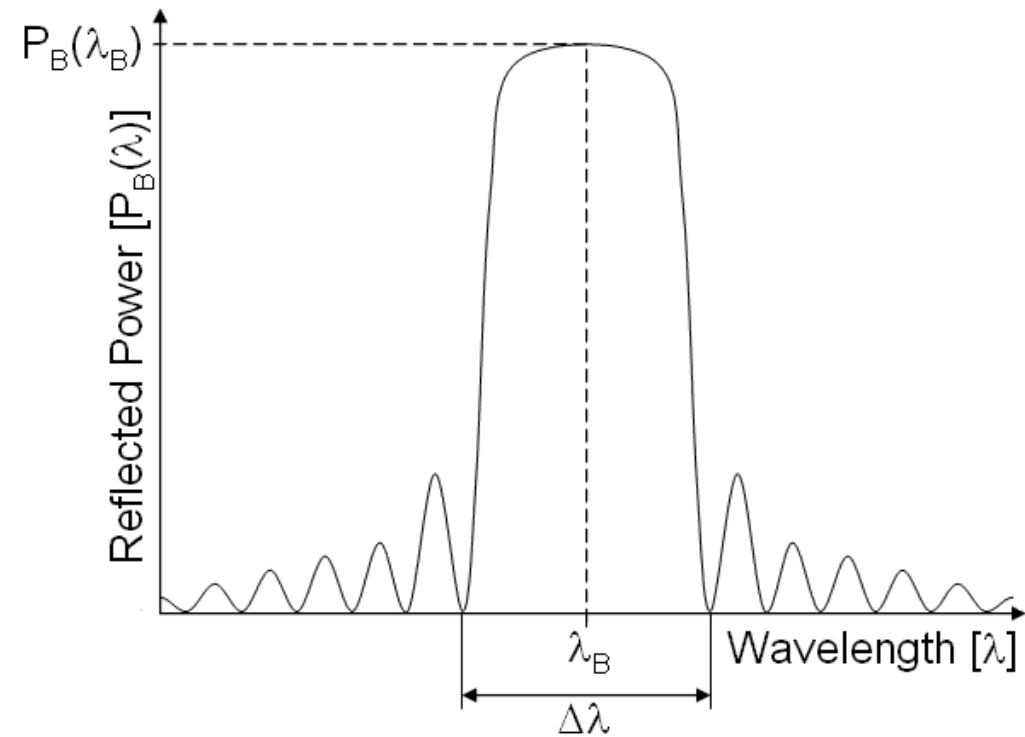
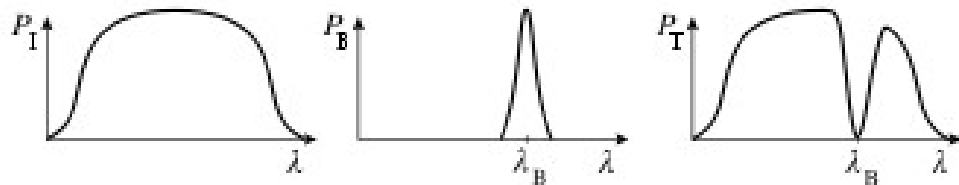
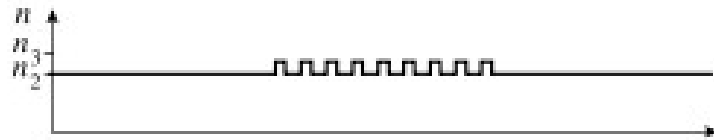
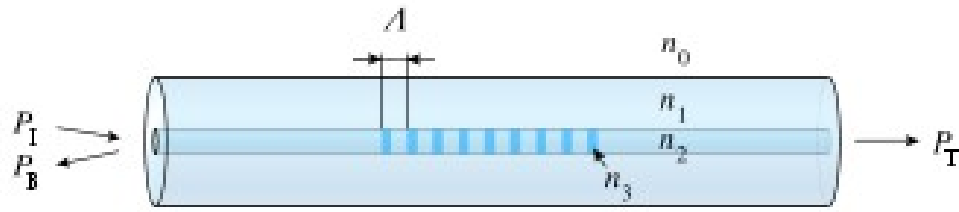


Bragg reflector

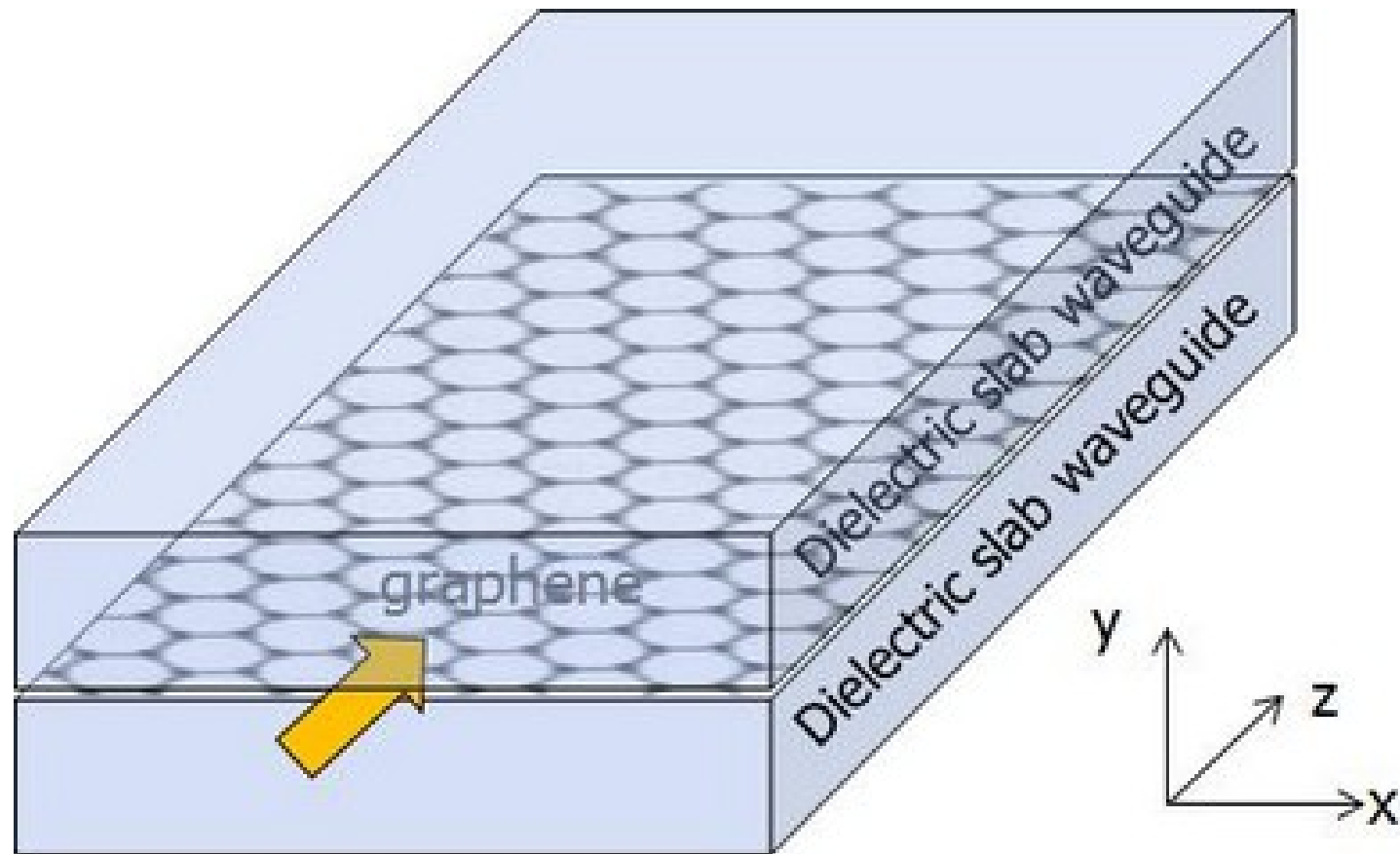


Source: Kayser-Threde GmbH

Bragg reflector



Graphene ribbon waveguide

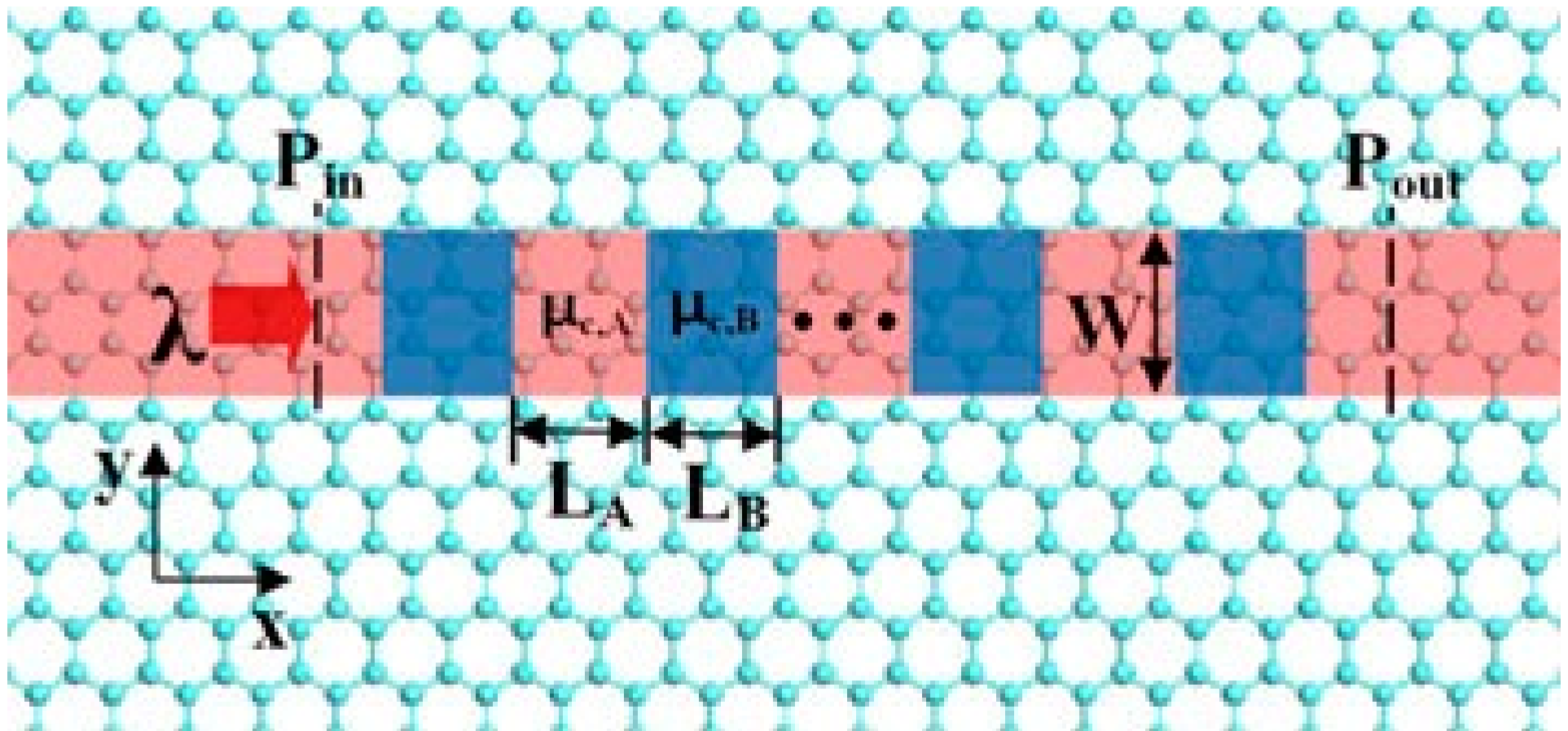


An ultra-compact tunable Bragg reflector based on edge propagating plasmons in graphene nanoribbon

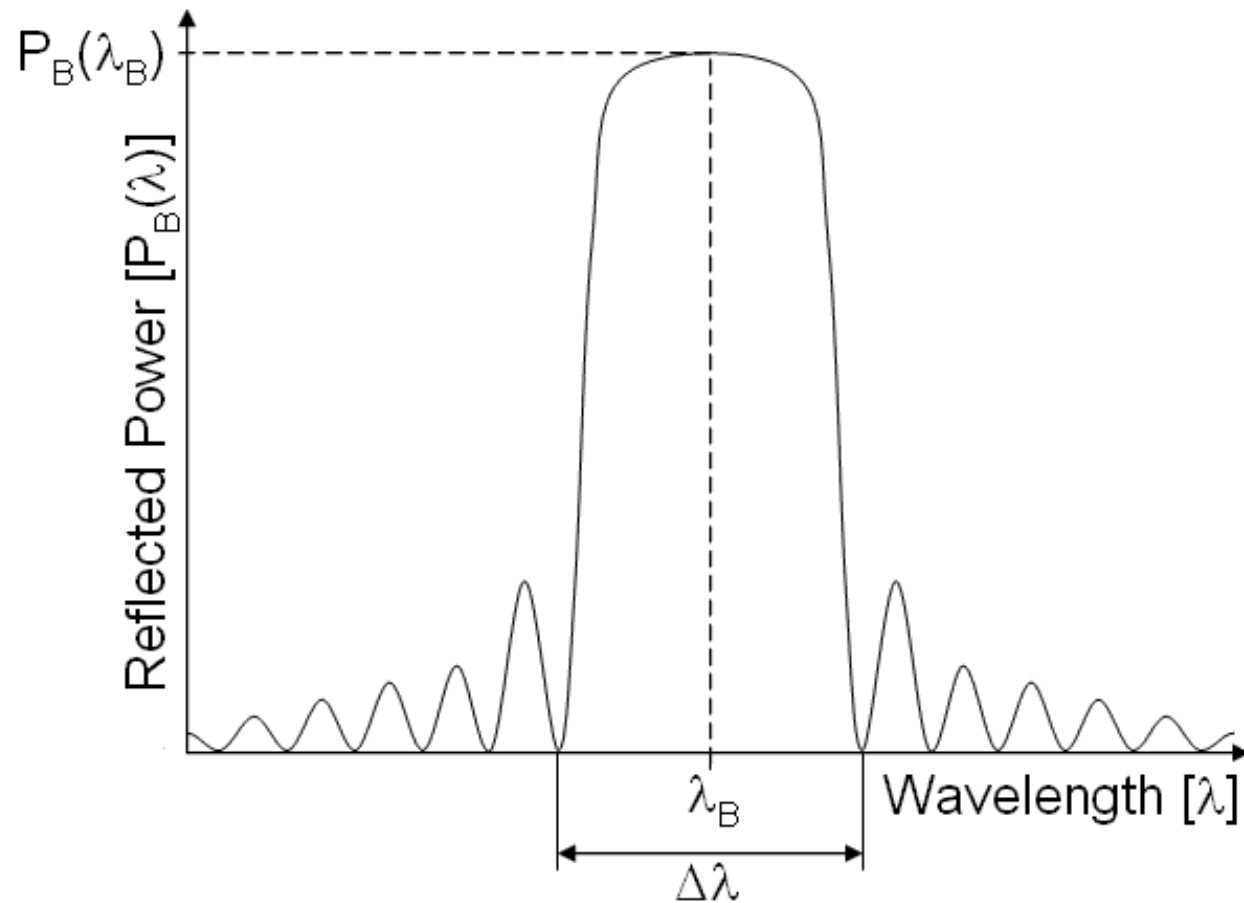
Zhen-Rong Huang, Ling-Ling Wang, Meng-Dong He, Hong-Ju Li, Bin Sun, Jian-Qiang Liu and Xiang Zhai

Journal of Modern Optics, 2014
<http://dx.doi.org/10.1080/09500340.2014.989926>

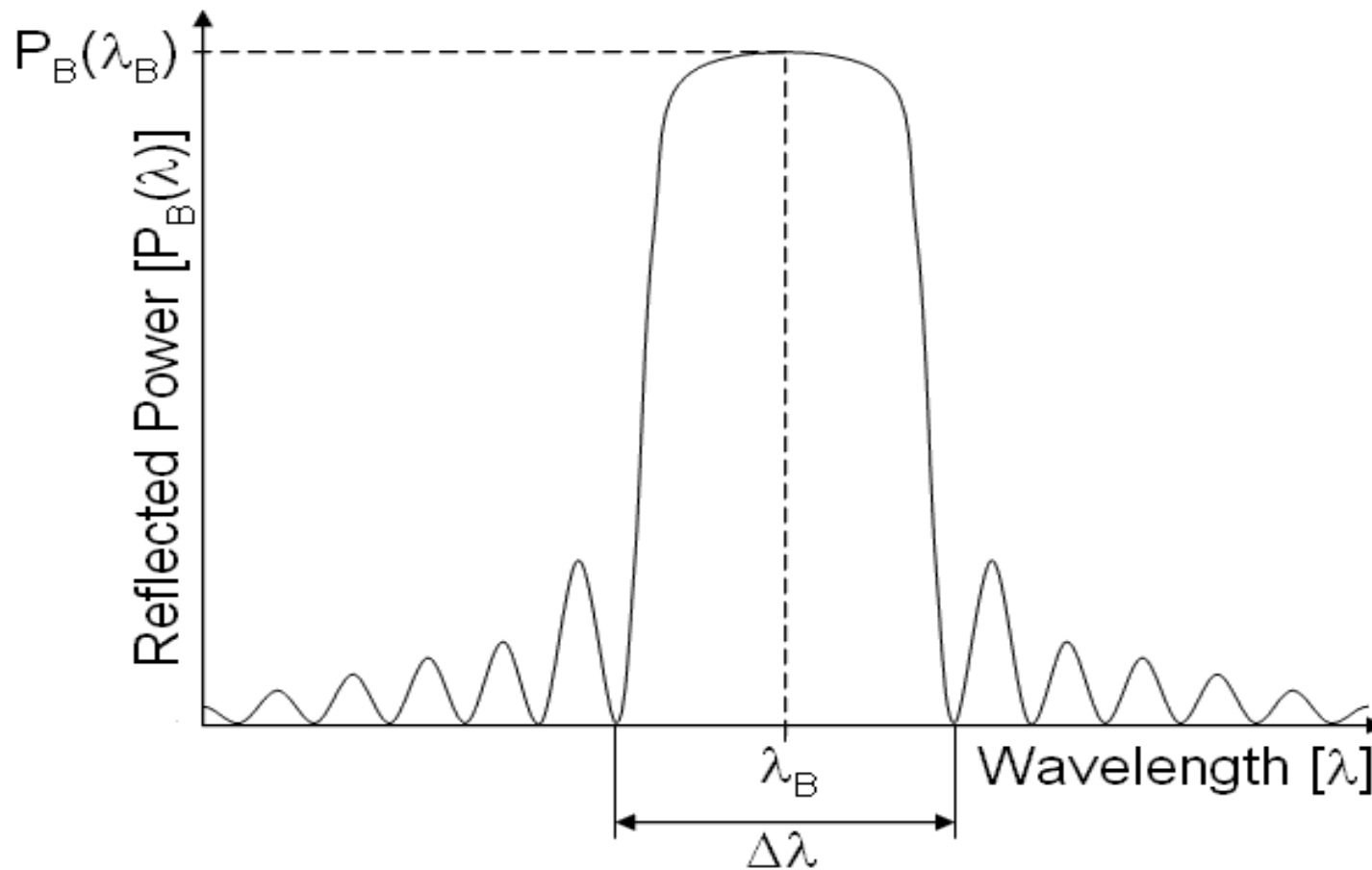
Graphene ribbon Bragg reflector



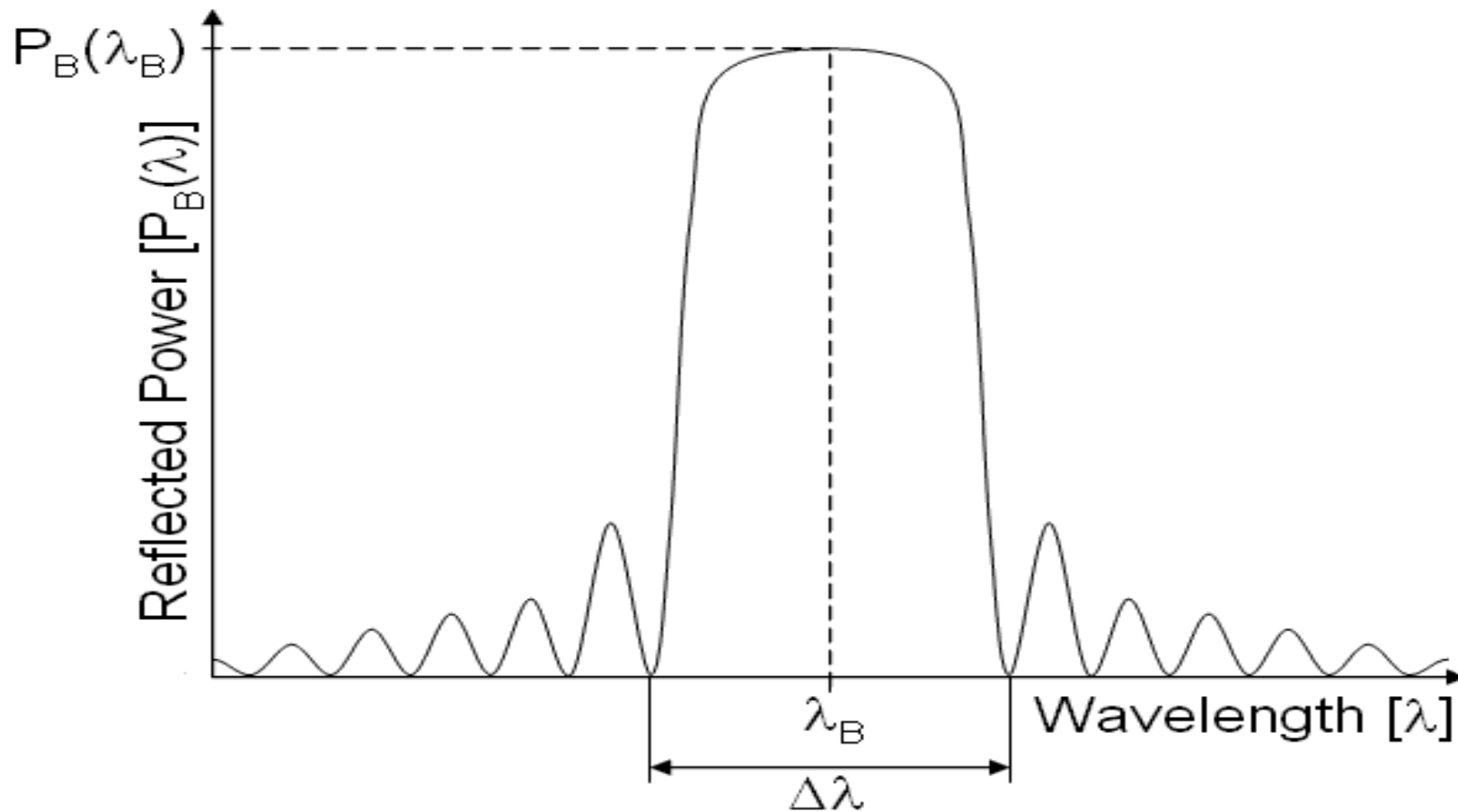
Tunable!



Tunable!



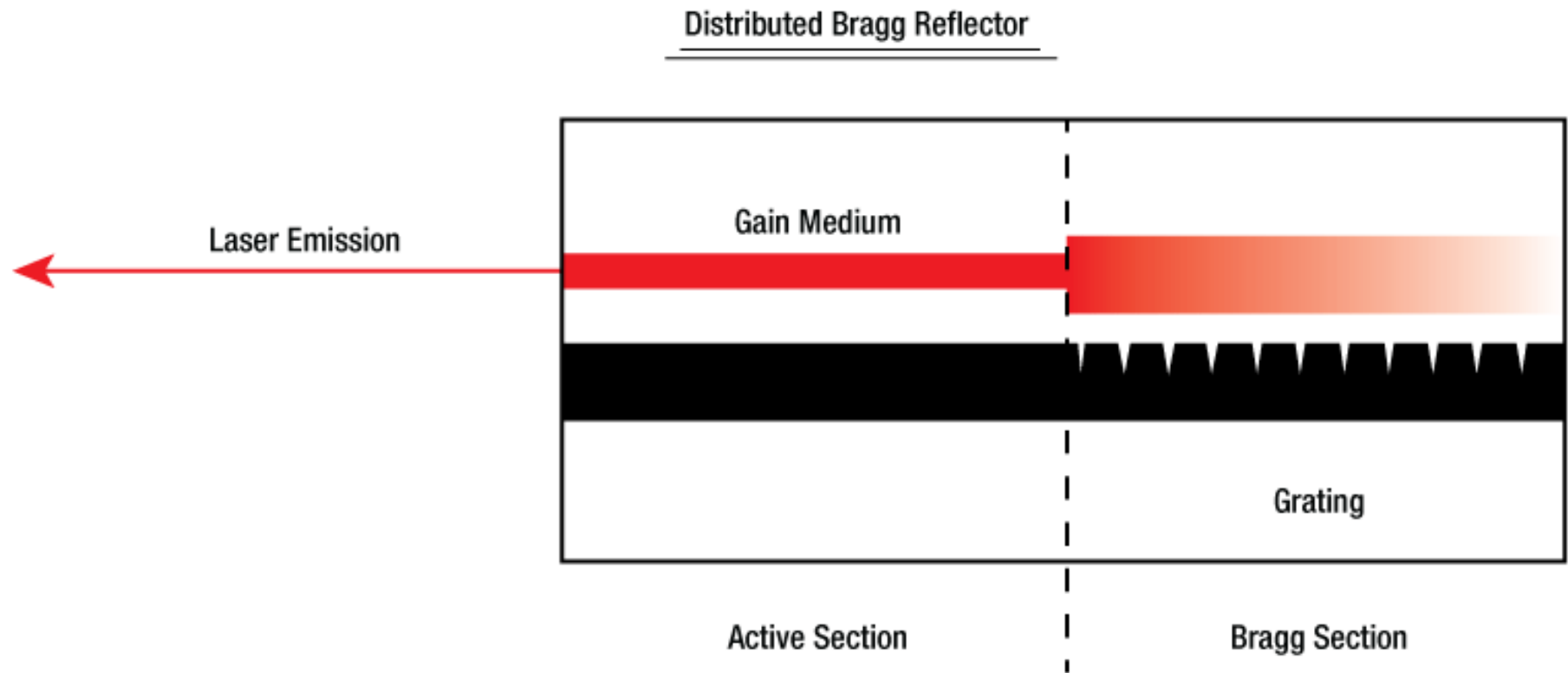
Tunable!



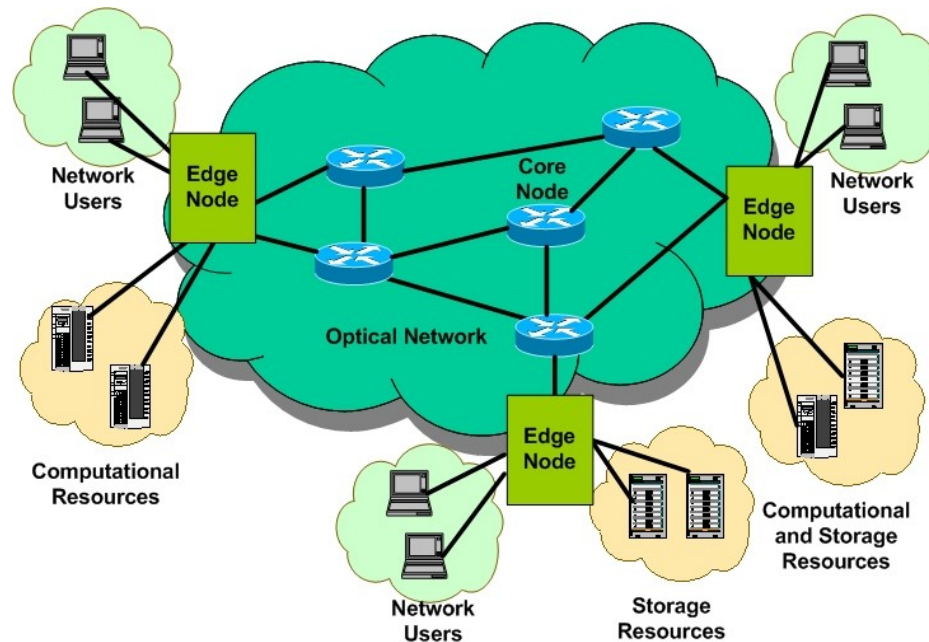
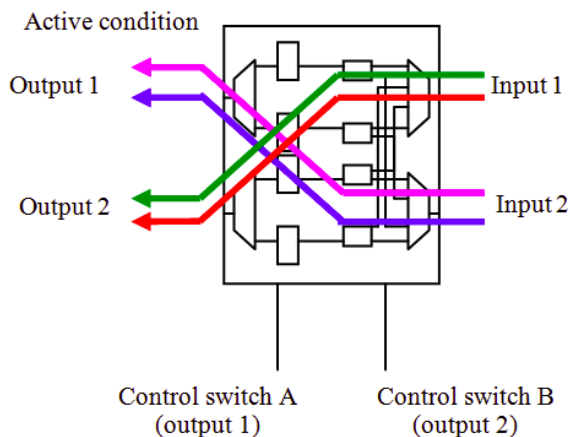
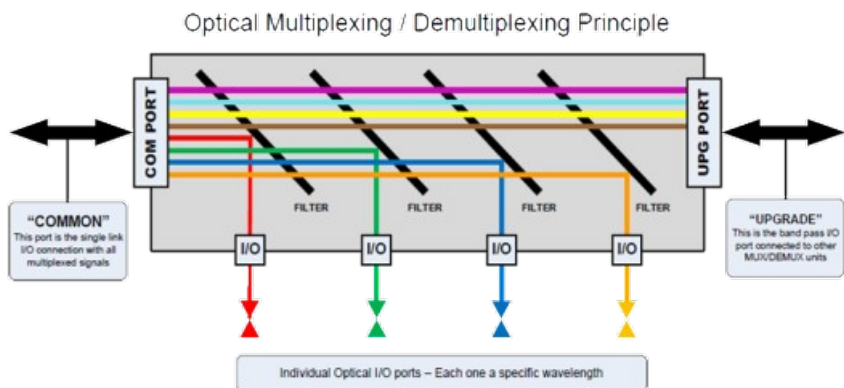
Uses?

- Good reflector
- Tunable
- Tiny
- Efficient
- Lasers
- Optical networks
- Optical Logic circuits?
(light computers?)

Bragg reflection laser

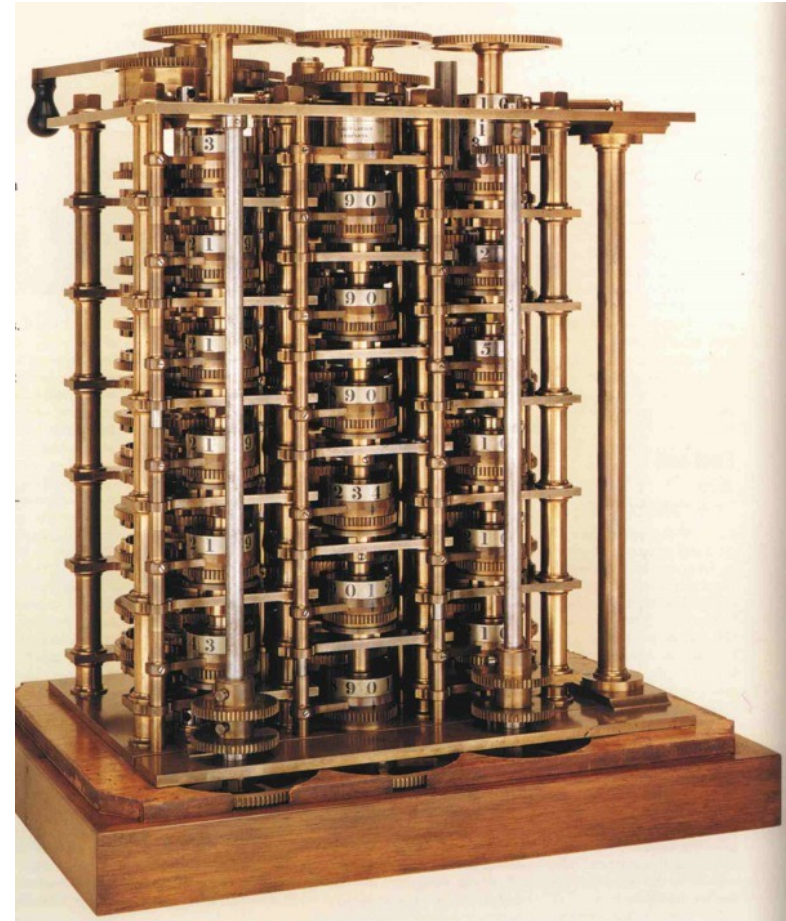
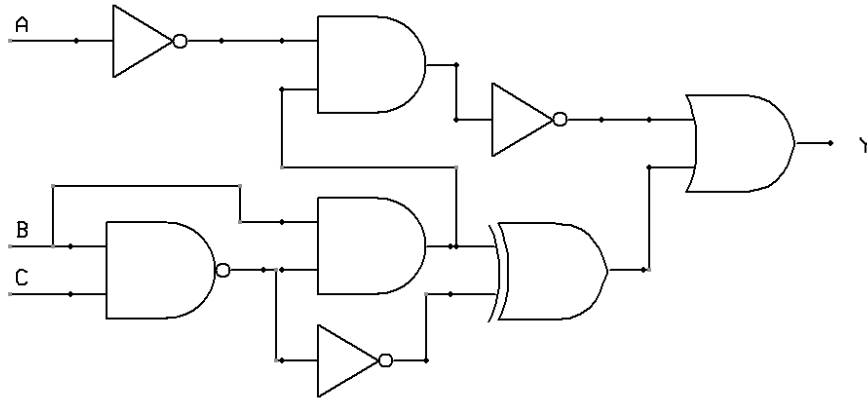


Optical Networks



Optical Logic circuits? Light computers?

A	B	C	Y
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	



Thanks for listening

An ultra-compact tunable Bragg reflector based on edge propagating plasmons in graphene nanoribbon

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