

# EPIPPROP

Bespoke simulation tool for WDM/DWDM devices

AWGs and Echelle Gratings  
Designed **Automatically**

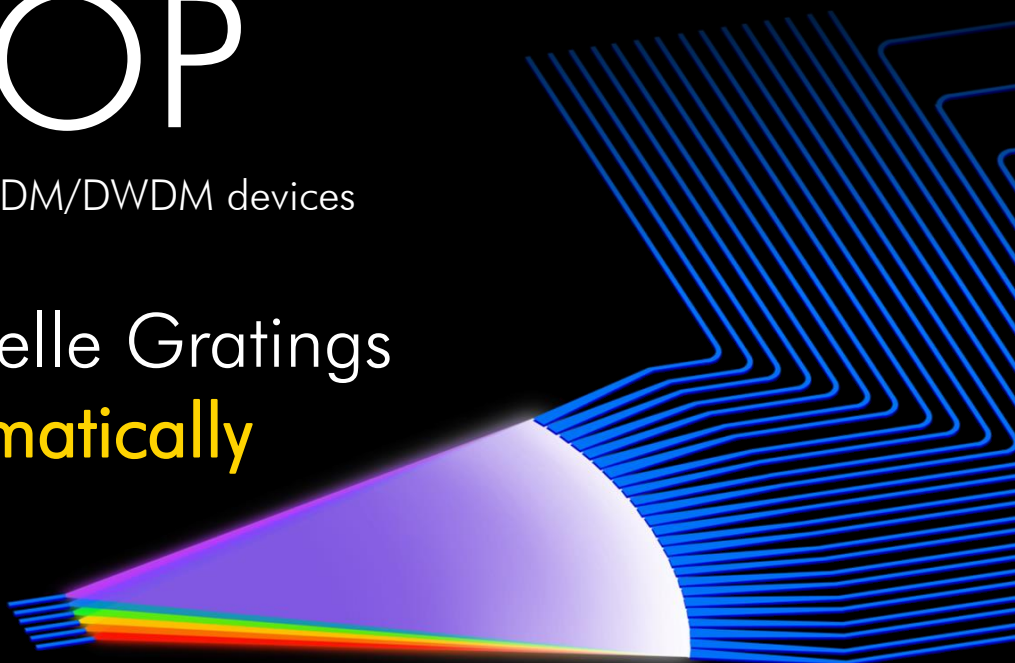
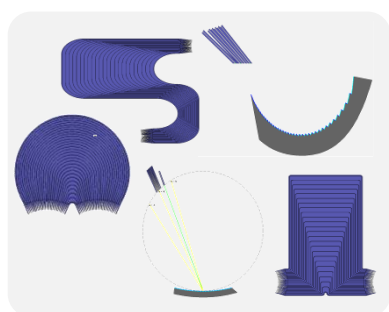
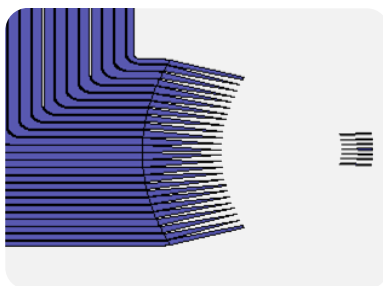


Diagram of 'Top Hat' AWG and Star Coupler



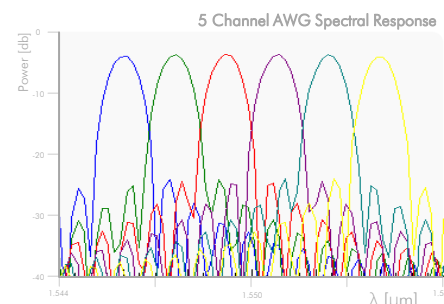
## Quick Start with Templates

4 AWG and 3 Echelle grating templates  
allow designers to see results on day one.



## Automated Design and Layout

Choose wavelength spacing of channels  
and EPIPPROP will calculate the route of  
your waveguides.



## Rigorous Full Vector 3D Simulations

State-of-the-art market leading models  
developed specifically for AWGs and  
Echelles, bringing unrivalled speed  
and accuracy.

Utilise Photon Design's proven track record of high performance electromagnetic simulations to design and simulate wavelength division multiplexing devices for your circuit including arrayed waveguides and Echelle gratings. EPIPPROP provides a low barrier to entry for testing WDM devices while providing further customisation for experienced designers.

Have your design fabrication ready with GDS-II export and tolerances investigated such as slab thickness variations and corner rounding in Echelle gratings.

[Start your 30 day trial today](#)



Photon Design have been serving the photonics community for over **30 Years** with market leading software for designing passive components, active components, and entire PICs. All of our tools are under continuous development driven by the feedback of our users and their cutting edge research.

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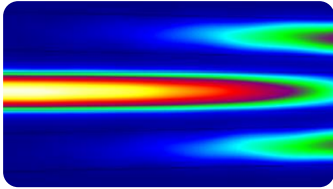
# Tapers and Cross-Coupling Input/ Output Arrays

## Using FIMMPROP – Waveguide Simulations with EigenMode Expansion

Its common for tapers to precede and follow the star coupler of a WDM device to improve coupling but the cross-talk between neighbouring waveguides can have a *significant effect on performance*.

To simulate this, EIPPPROP will call Photon Design tool FIMMPROP to use it's rigorous EigenMode Expansion method, modelling how adiabatic the tapers are and how they couple to neighbouring waveguides.

EIPPPROP will pilot FIMMPROP so you don't need to master a new tool.

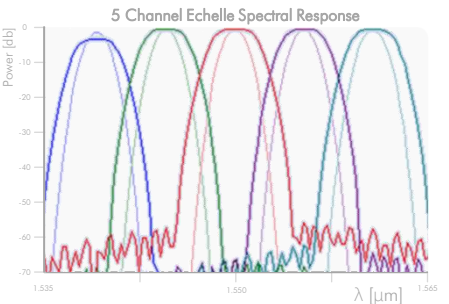
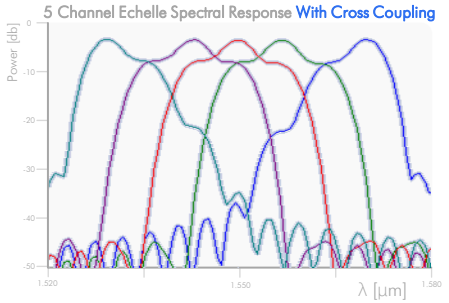
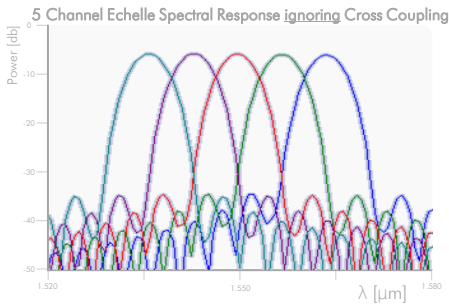
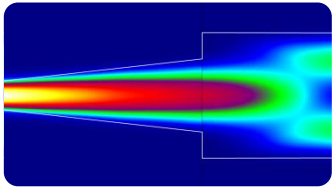


## Wide Channel Designs

### Using FIMMPROP – Waveguide Simulations with EigenMode Expansion

Channel broadening increases the wavelength tolerance of WDM devices, accommodating for multiple sources of error such as temperature variations, doping, and imperfections in the slab (which can be simulated in EIPPPROP).

Using an MMI as an input broadens the channels without introducing multi-modal behaviour at the input and output waveguides. MMIs at the input of an EIPPPROP device are co-simulated rigorously using Photon Design's tool FIMMPROP and its EigenMode Expansion method.



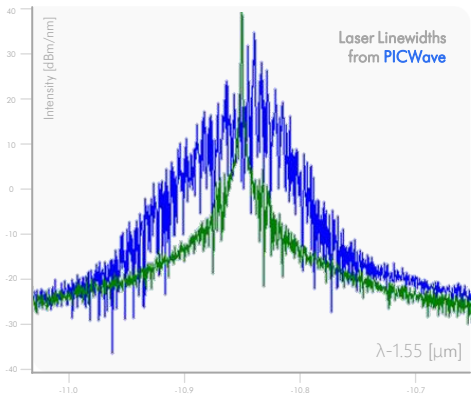
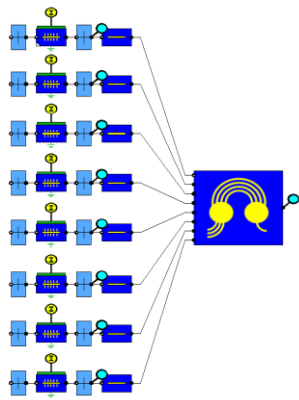
Full Colour – Broader bands using MMIs  
Faded Colour – No MMI used

## Export for Full Circuit Simulation

### Using PICWave – Time Domain Circuit Simulator Including Active Components

Simulate EIPPPROP devices in the full context of their circuit by exporting results to PICWave and address unforeseen effects.

This circuit (right) contains an array of high reflectivity DFB lasers connected to an AWG simulated in EIPPPROP including the reflectivity at each set of facets. By simulating the lasers and AWG together the negative effect the back reflections becomes apparent, drastically expanding the line width of the lasers.



With Facet Reflections [Linewidth = 2.58 MHz]  
Without Facet Reflections [Linewidth = 4160 MHz]

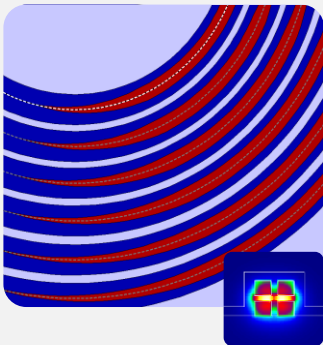
## Coming Soon – Further Customisation

### Slot Waveguides

EIPPPROP's upcoming version will allow each AWG arm to be extensively customisable, including with the ability to include tapers and slots for advanced polarisation-independent designs.

### Star Coupler Simulations

Coming soon, star couplers can be designed independently from their AWGs. This continues to include export of results to circuit simulators like PICWave and GDS-II to layout tools.



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