Integrated photonics roadmaps: enabling high performance packaging

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Safe Harbor

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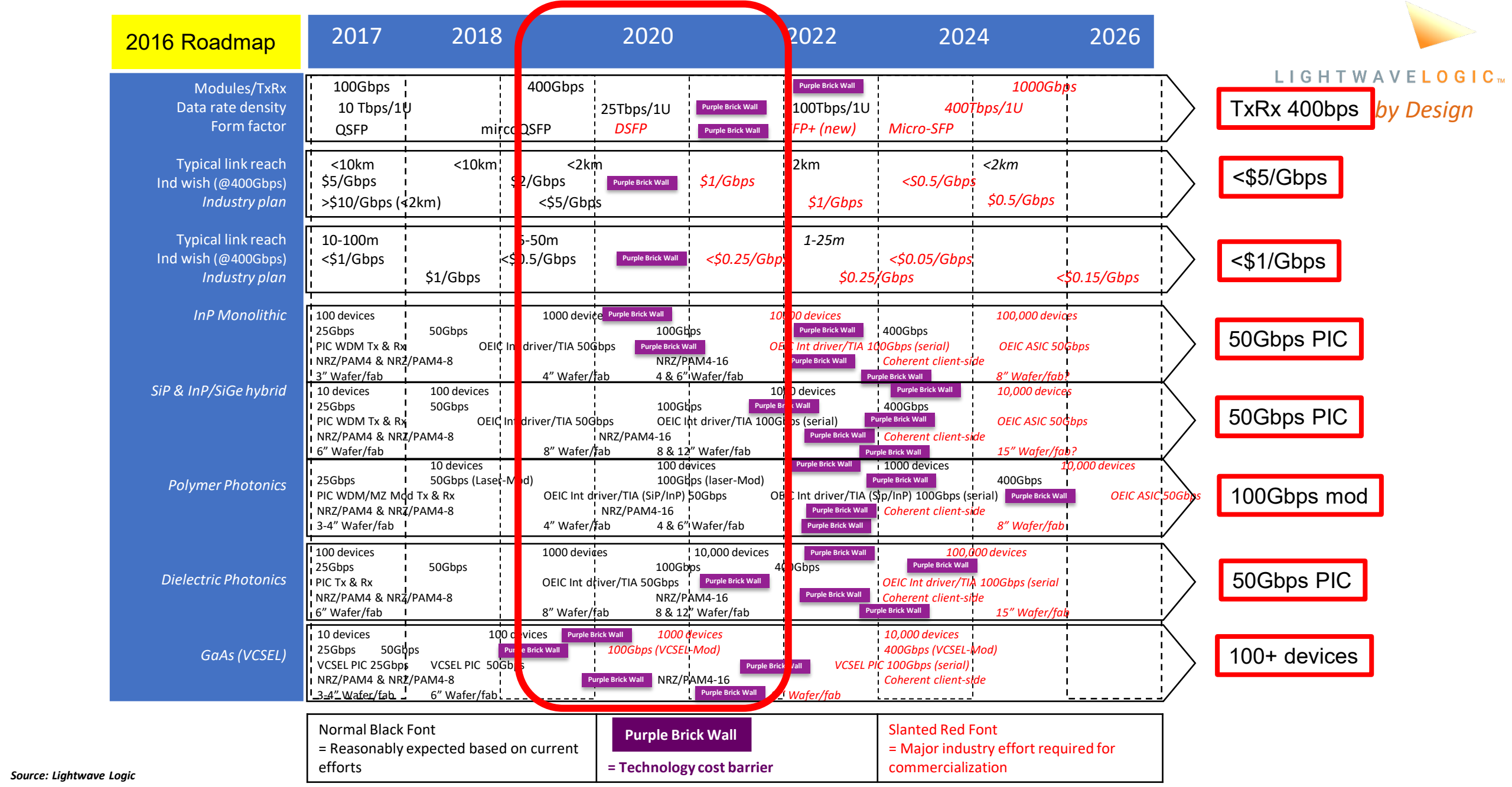
This grey bar is the takeaway summary from each slide…



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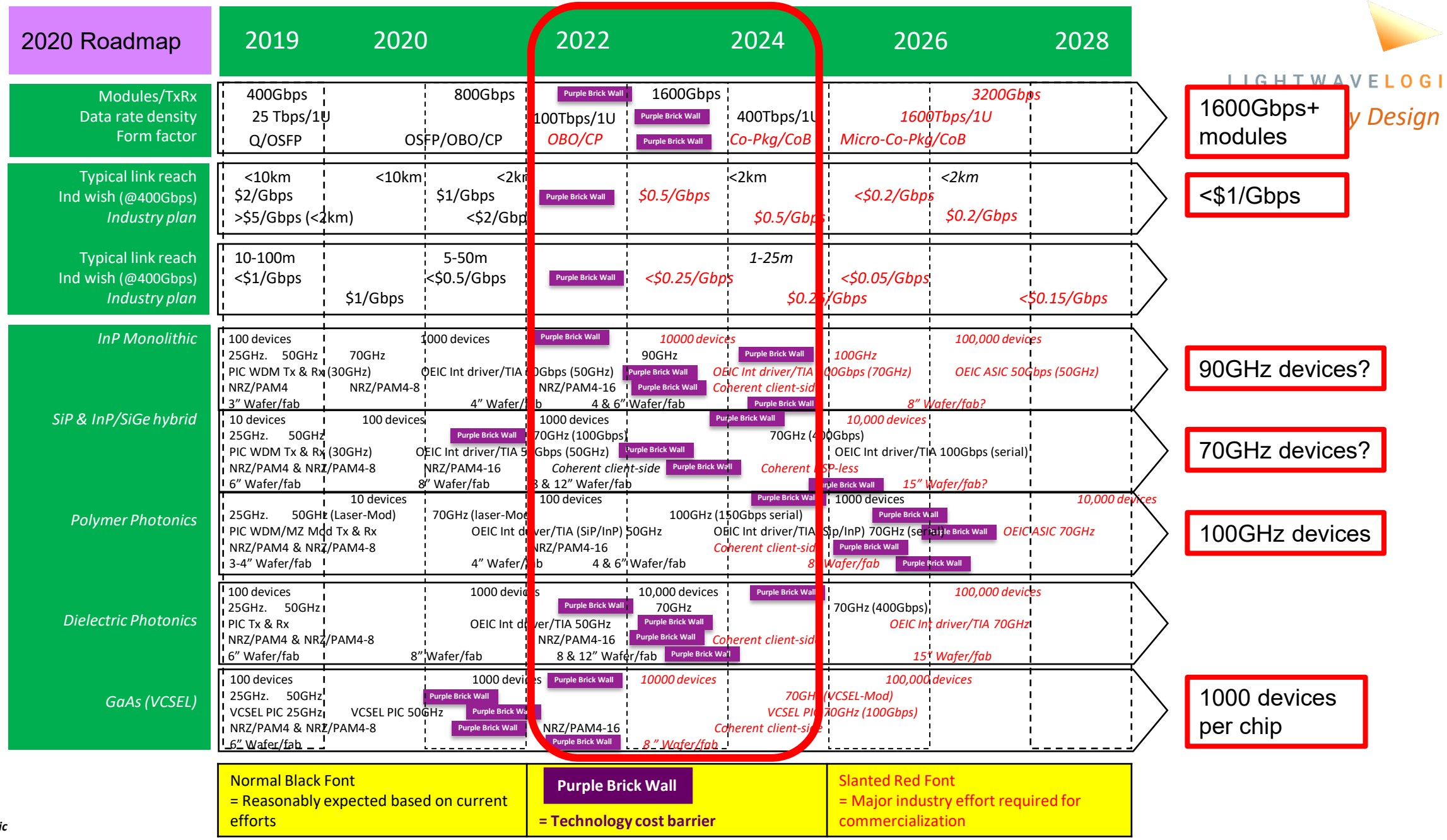
Source: Lightwave Logic

Was the prediction accurate 4 years on?

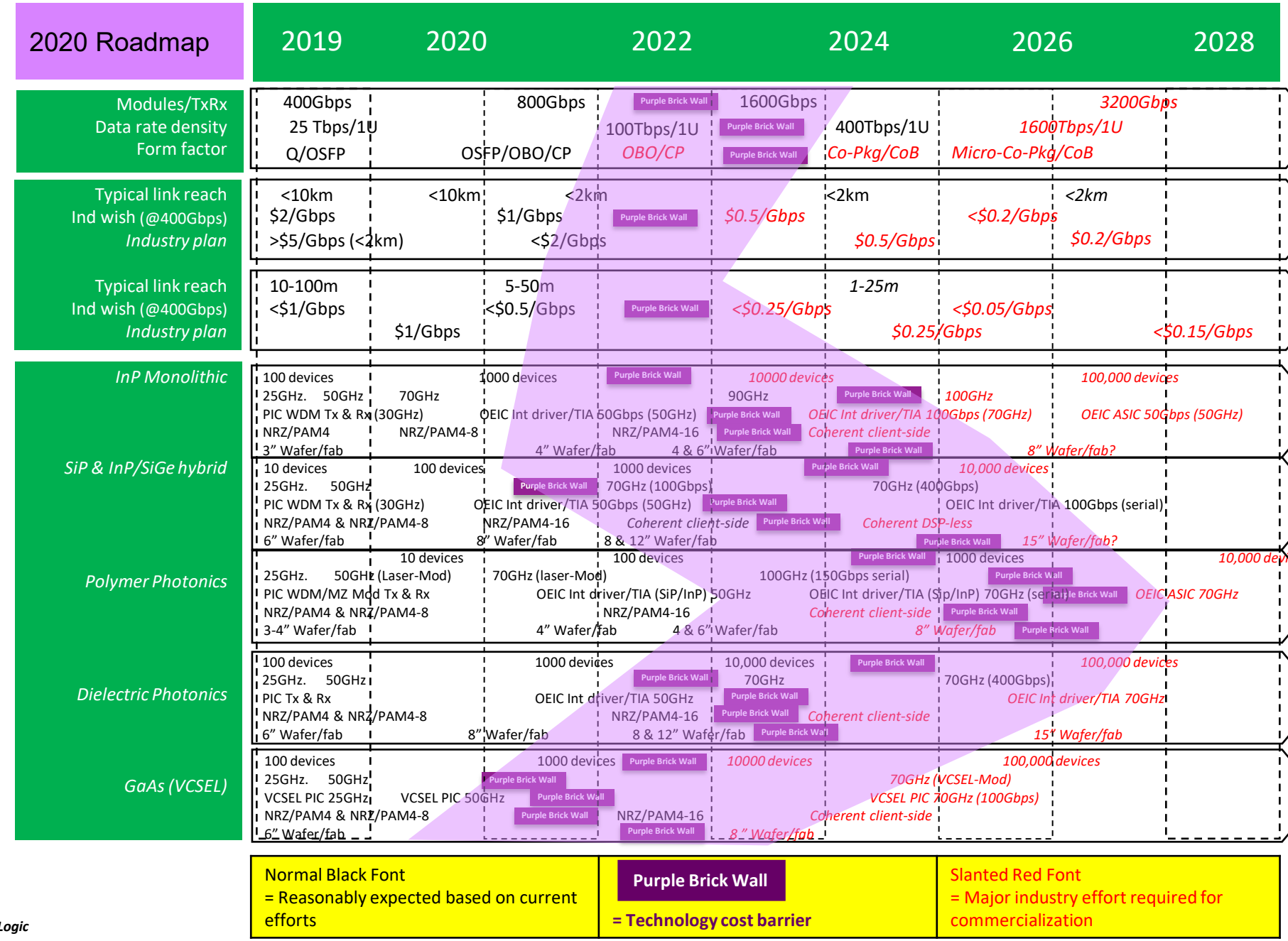


LIGHTWAVELOGIC™

y Design

Source: Lightwave Logic

Integrated photonics roadmap prediction for 2023: Packaging must enable 'fast and energy efficient'…



Source: Lightwave Logic

Can we penetrate the 'Purple Brick Wall'? Some technologies are suited for this…others need $$$

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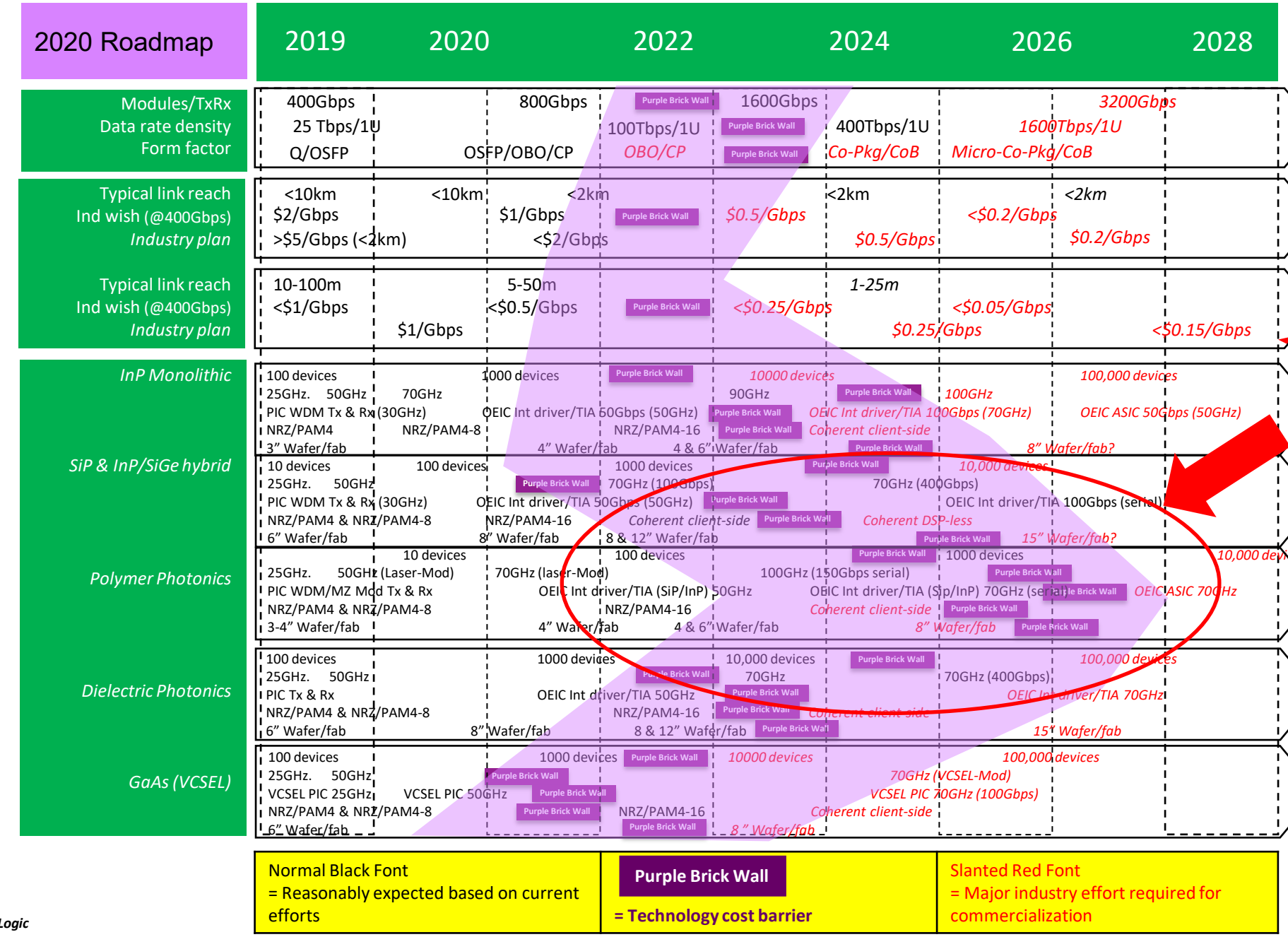
Faster by Design



High speed and low power club…

Polymers are additive to integrated photonics and hybrid platforms

Source: Lightwave Logic

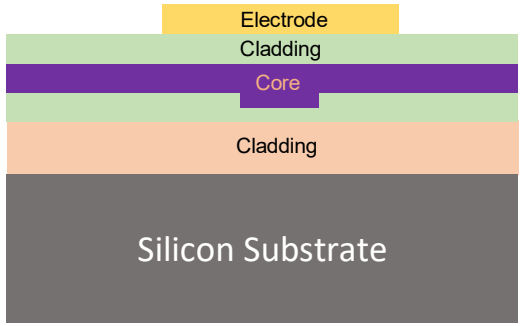
EO Polymers have low power and high bandwidth natural ability…

Electro-optic polymers for high-speed, low voltage

LIGHTWAVELOGIC™

Active polymer is additive to semiconductor platforms to enhance performance

Polymer Stack™

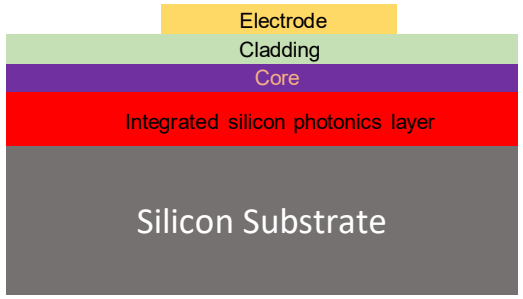


Classic!

Polymer stack modulator

- 3-layer polymer stack waveguides
- Linear Pockel's effect phase modulator (or Amplitude modulator if in Mach-Zehnder
- Excellent high-speed performance (>70 GHz), low voltage (~1 V Vπ, and high stability.
- Standard fab equipment & methods

Polymer Plus™

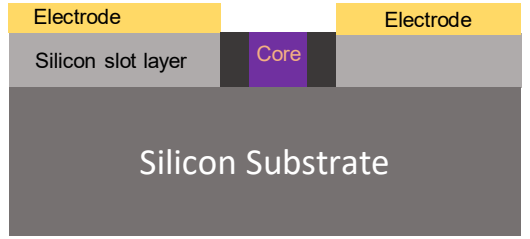


Additive!

Simpler and easier to integrate

- Minimizing polymer layers for integration of modulator with other devices in Si (or other) PIC
- Spin-on wafer-level hybrid integration

Polymer Slot™



Tiny!

Polymers in Si slot modulators

- Small size for highest integration levels
- Modulator device itself is hybrid silicon-EO Polymer (Silicon provides the waveguiding and electric field, EO polymer provides the high-speed EO functionality)

Polymer modulators…easy to fab, low power, fast, and flexible in performance

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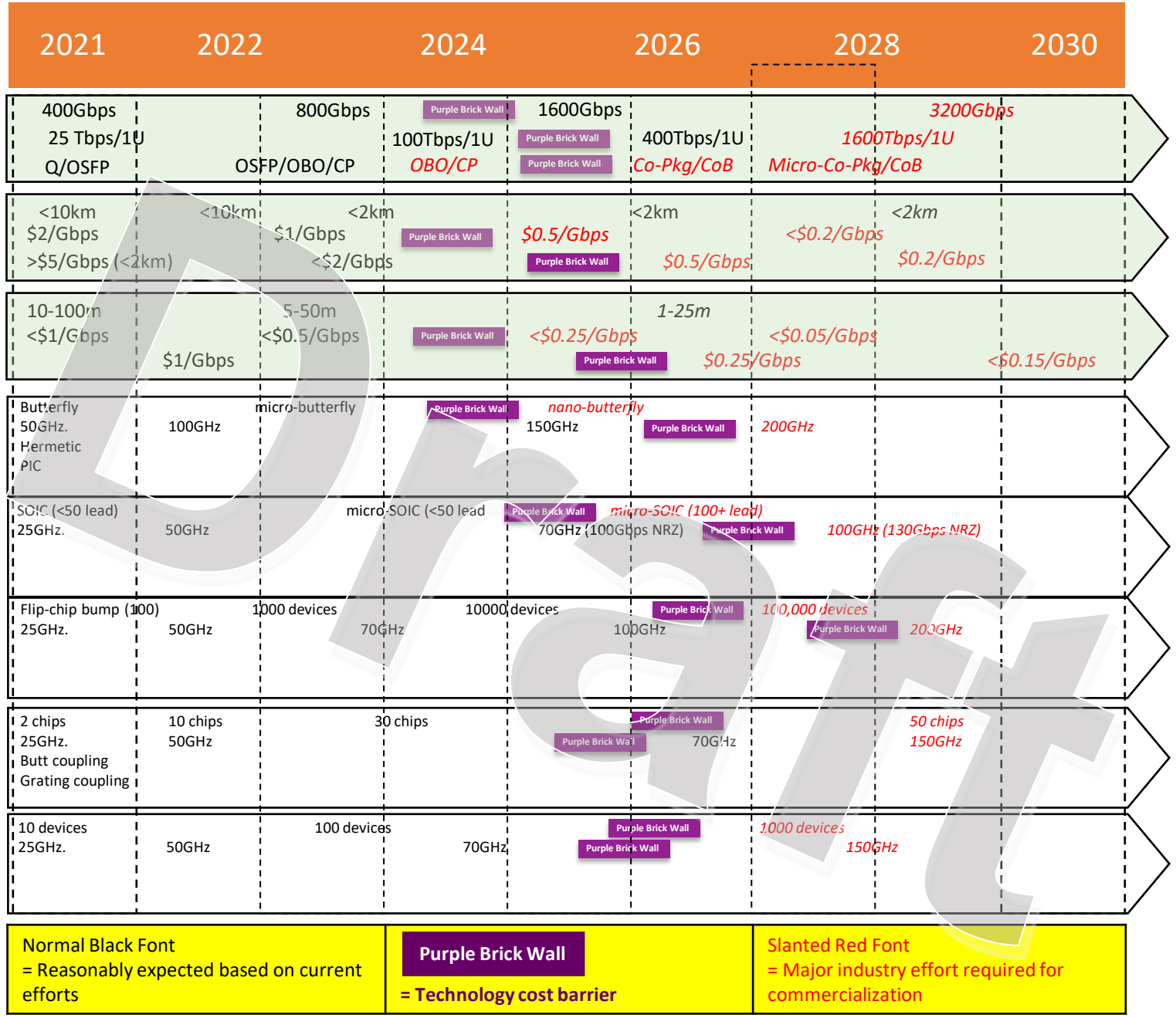
2022 Roadmap (Packaging)



Normal Black Font	Purple Brick Wall	Slanted Red Font
= Reasonably expected based on current efforts	= Technology cost barrier	= Major industry effort required for commercialization

These boxes are empty – we could plan to fill them ***from a packaging standpoint***…

Source: Lightwave Logic

Draft

Packaging roadmap for integrated photonics: who wants to volunteer?