New software version for photonics and optoelectronics design

VPIphotonics Design Suite™ Version 11.1

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We Empower You to Define the Cutting Edge!

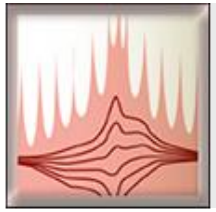
VPIphotonics Design Suite™

Transmission Design

VPI
Lab Expert

VPItransmissionMaker
Optical Systems

Component Characteristics ⇅ System Requirements



Component Design

VPIcomponentMaker
Fiber Optics

VPIcomponentMaker
Photonic Circuits

Integrated *suite of transmission and component design tools*

Interoperable *with 3rd party software*

python™ · Nazca design™ photonic IC design framework · DLL · MATLAB SIMULINK · LUCEDA PHOTONICS · SIMULIA · SYNOPSYS® · Microsoft™ COM+ · KEYSIGHT TECHNOLOGIES · Mentor Graphics®

Industry leading *capability & feature enhancements in VPIphotonics Design Suite™ Version 11.1*

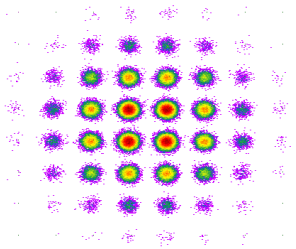
- Probabilistically Shaped QAM
- Digital Signal Processing
- PAM4 Signal Analysis
- Transient SPICE Simulations
- Integrated Optical Modulators
- Multimode Fibers and Couplers
- …and many more

Probabilistically Shaped (PS) QAM

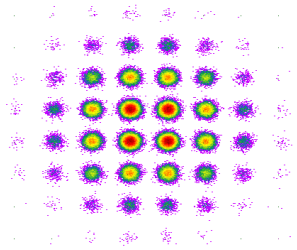
New module generates polarization-multiplexed optical signals with probabilistically shaped quadrature amplitude modulation

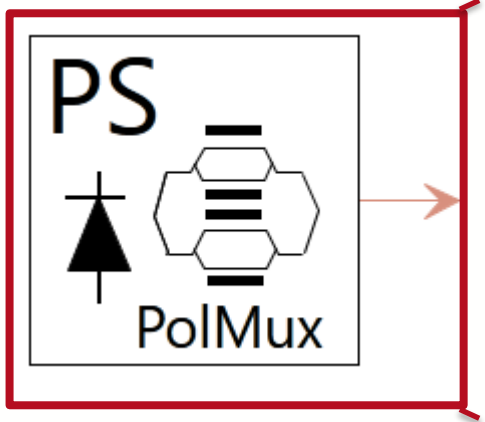
- Probabilistic constellation shaping offers an SNR gain to approach ultimate capacity of AWGN Channel
- Complete transmitter that contains both electrical and optical sections
- Can be connected directly to an optical fiber

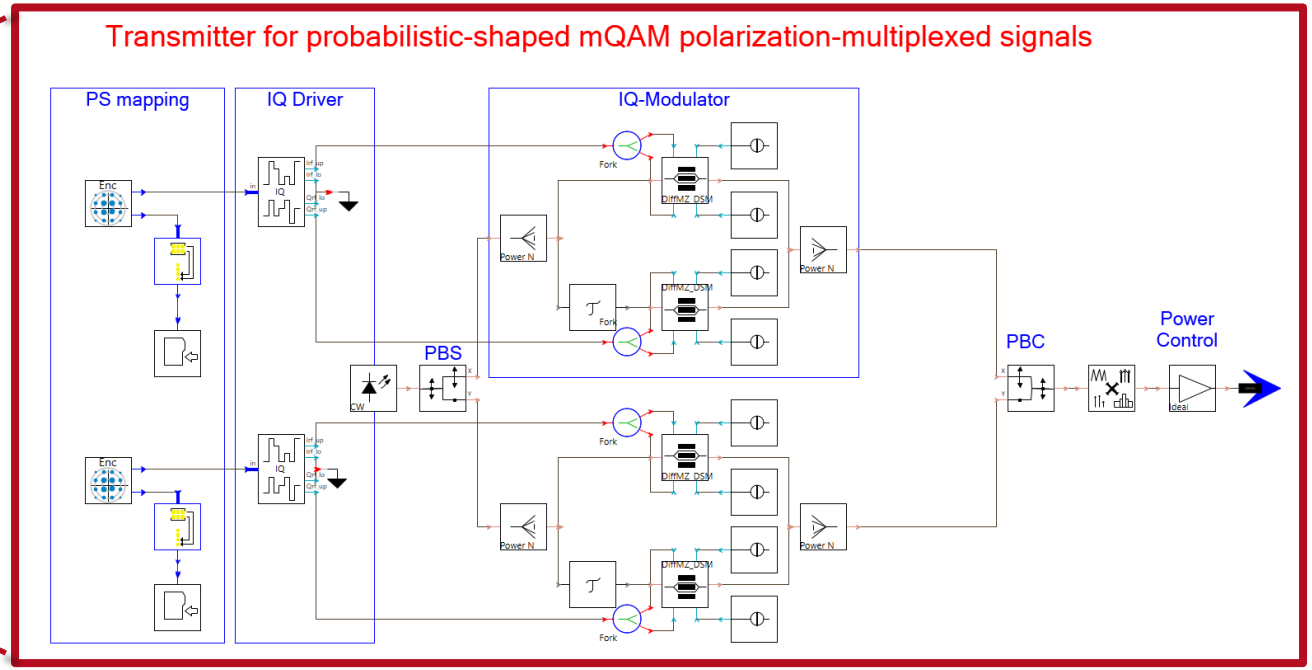
X-polarization



Y-polarization





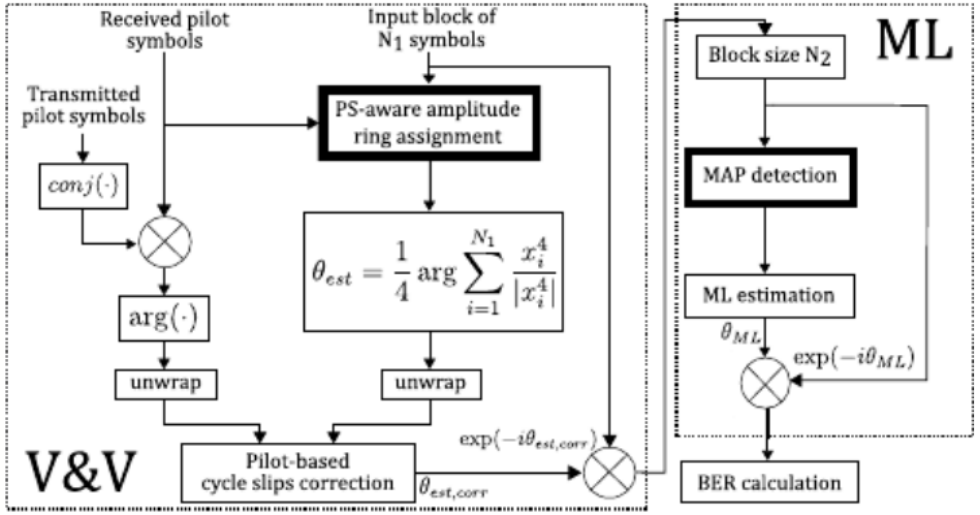


- Carrier Phase Recovery for PS-mQAM
  - New application demonstration added
    - Generate PS-QAM signal and perform CPR
  - The blind CPR algorithm consists of two-stages*
    - Modified Viterbi & Viterbi and Maximum Likelihood Phase Estimation

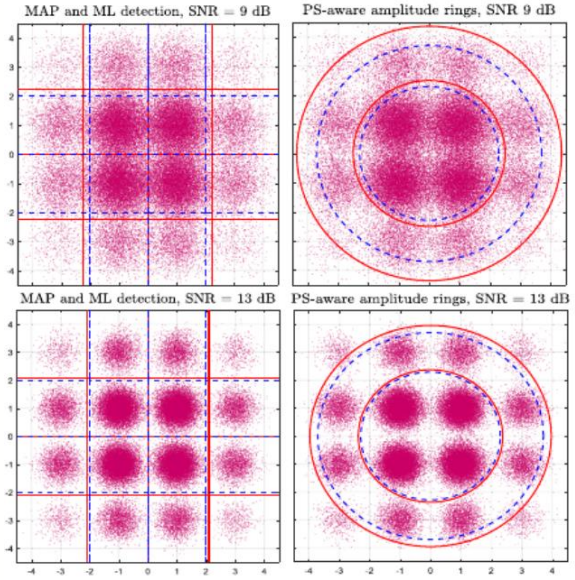
New CPR algorithm for PS-mQAM

TDE-MIMO algorithm to work for BPSK

Block diagram of the two-stage CPR

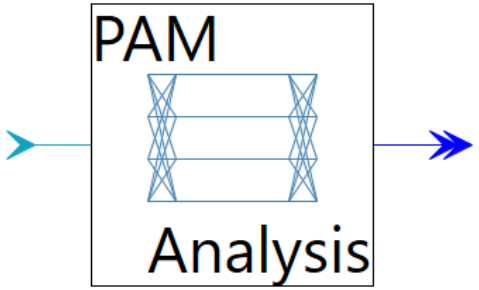


Decision regions over a PS 16-QAM constellation



*G. Di Rosa, et al., "Low Complexity Blind Carrier Phase Recovery for PS-QAM," IEEE Photonics Technology Letters.,vol. 32, no. 17, 2020.

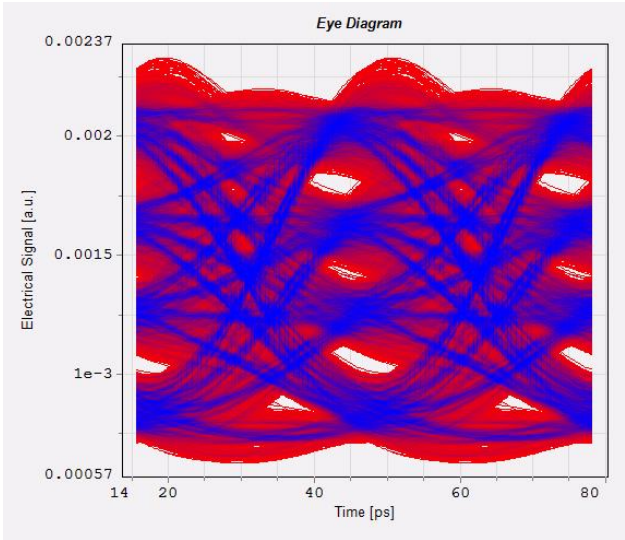
PAM-M Signal Analysis



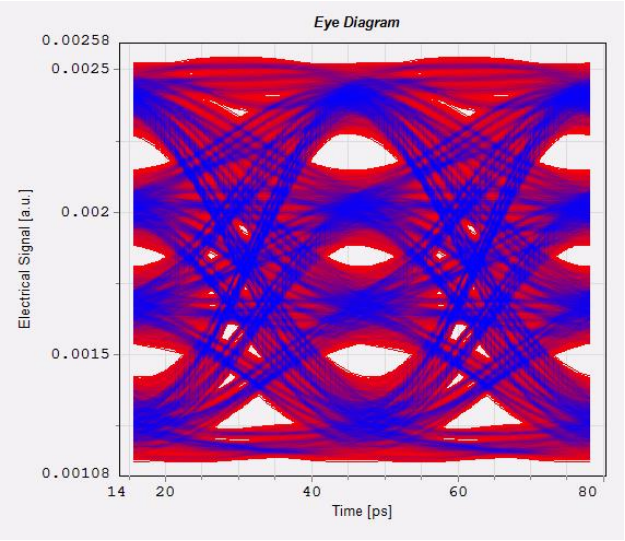
New analyzer calculates a number of metrics for binary and PAM4 electrical signals

- PAM4 signal metrics:
  - BER (SER) analysis
  - Eye width
  - Eye height
  - Eye skew
  - Linearity
  - Outer OMA
  - And more!

Eye Skew = 3.90, SER = 1.7e-3



Eye Skew = 1.95, SER = 4.5e-4

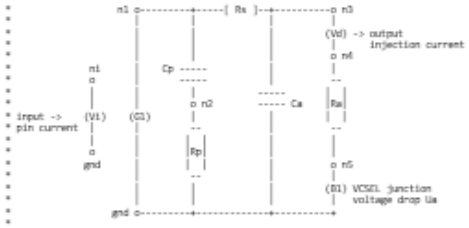


32GB PAM4, DM-VCSEL, 100m MMF, variable I_{bias} of drive signal

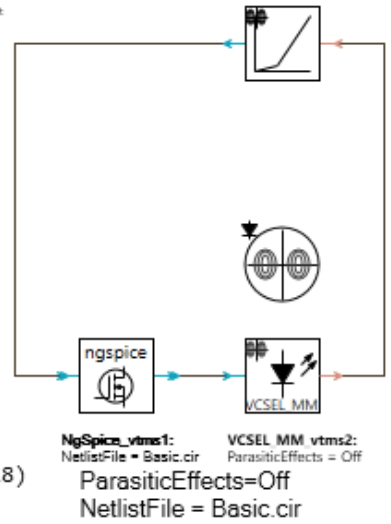
Transient SPICE Simulations

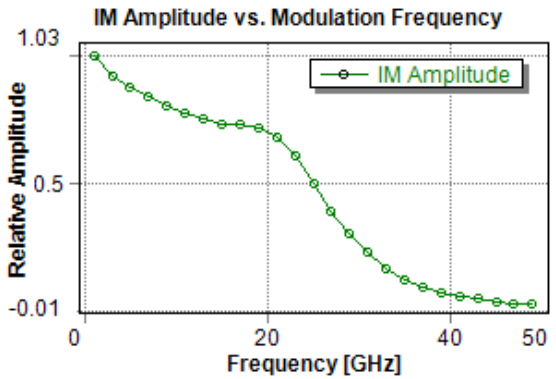
New capability of SPICE co-simulation for detailed modeling of electrical circuits

- Detailed modeling of individual electronic devices
  - Laser Drivers
  - TIAs
- Equivalent circuits of optoelectronic components
  - Parasitic Circuits
  - Laser Junction Characteristics



```
.title BasicCircuit
Vi ni gnd DC 0 external
G1 gnd n1 ni gnd 1
Cp n1 n2  C = {Cp}
Rp n2 0   R = {Rp}
Rs n1 n3  R = {Rs}
Ca n3 0   C = {Ca}
Vd n3 n4  0
Ra n4 n5  R = {Ra}
B1 n5 0   V = 45e-3*ln(1+i(Vd)/1e-18)
.end
```

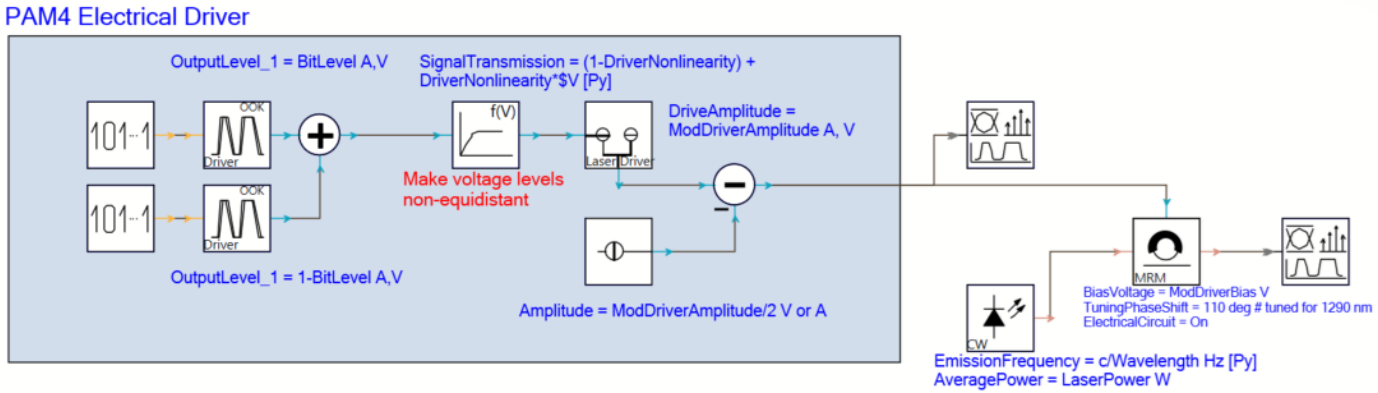


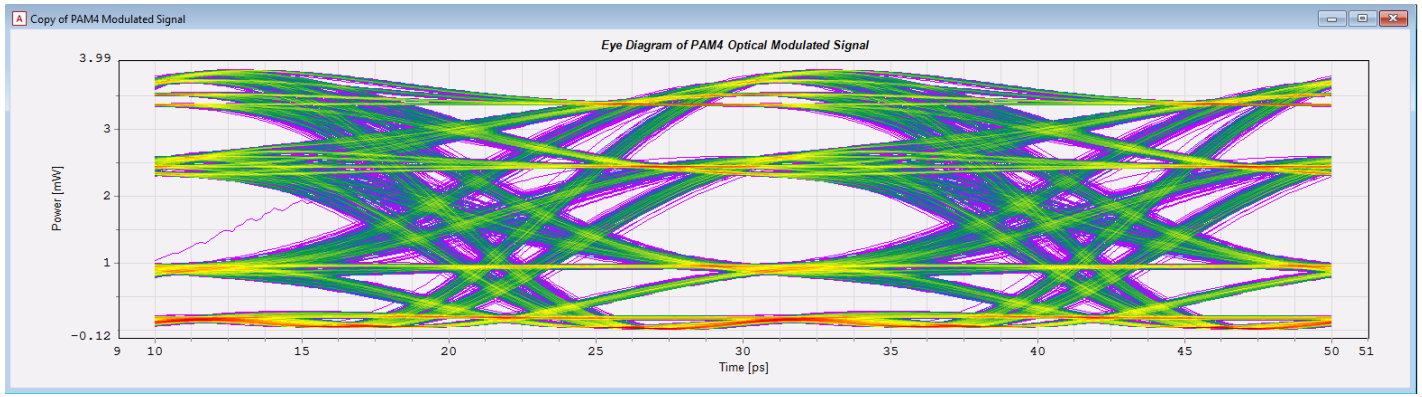


Integrated Optical Modulator

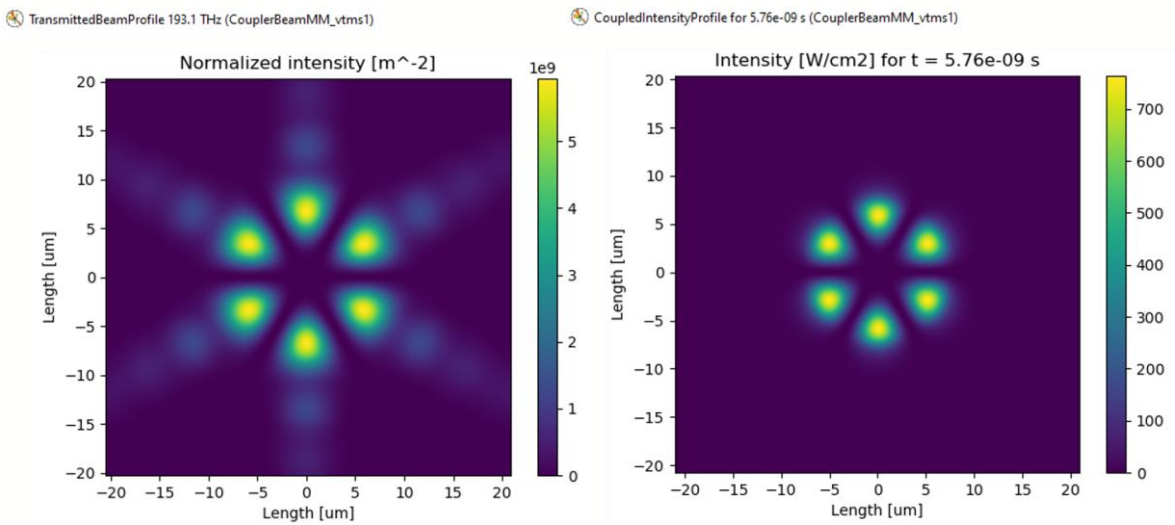
New system-level Microring Modulator (MRM) model for optical interconnect applications

- Detailed circuit-level Silicon-MRM introduced earlier this year
- New system-level model includes
  - Linearized equivalent circuit that simulates electrical properties
  - Dynamic ring resonator model that simulates optical behavior based on electro-optical modulation of the MRM waveguide refractive index and loss





Multimode Fibers and Couplers



Input Gaussian beam converted to an LP31-like field pattern using the phase-SLM followed by a lens and then coupled into the LP31 mode of a few-mode fiber

New features for simulation of short-reach multimode links and Space Division Multiplexing (SDM) systems

- Multimode Coupling
  - Enhanced multimode coupler models that support advanced imaging systems with multiple optical elements (lenses, apertures, spatial light modulators) separated by free-space propagation
- Multimode Fiber Characterization:
  - New test bench for measuring chromatic dispersion and its slope is now available
  - Implemented according to IEC 60793-1-42

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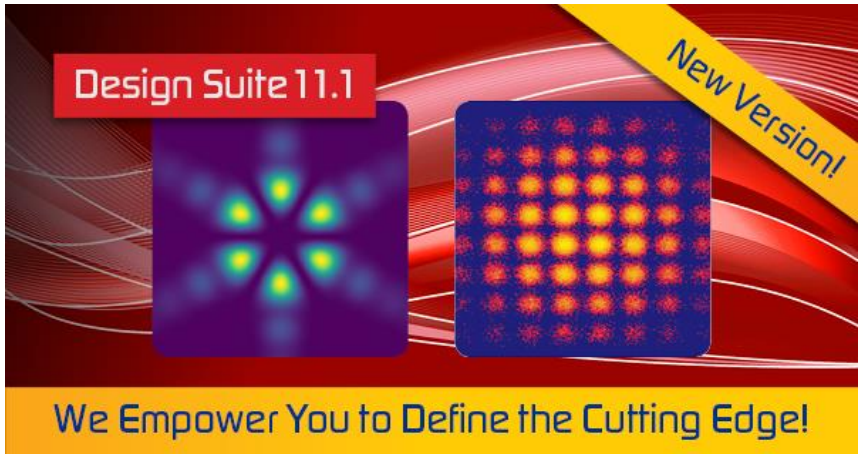
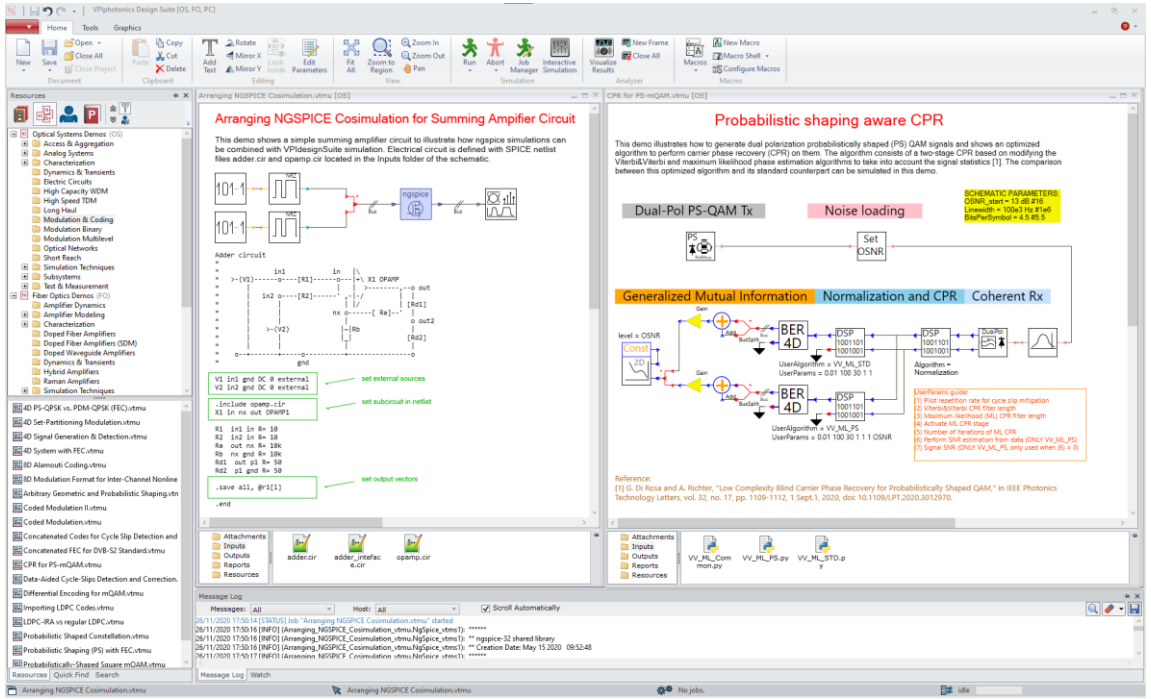
https://www.vpiphotonics.com/DSv111





For a Free Product Demonstration & Evaluation Contact Me:

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