

Use of silicon photonics wavelength multiplexing techniques for fast parallel readout in high energy physics

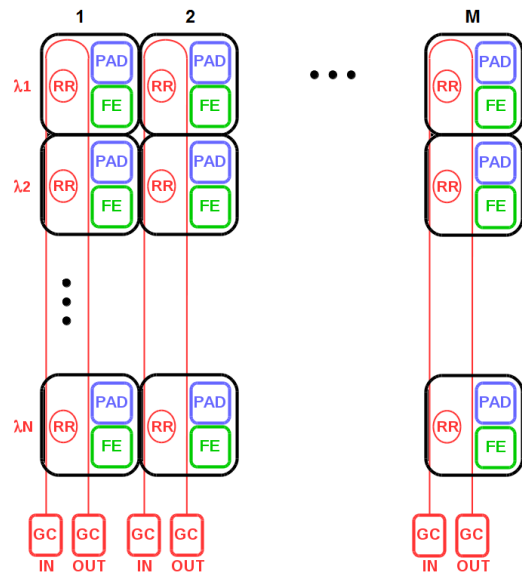
G. Alimonti(1), R. Ammendola(2), A. Andreazza(1), D. Badoni(2), V. Bonaiuto(3), M. Casalboni(3), **F. De Matteis(3)**, A. Mai(4), G. Paoluzzi(2), P. Proposito(2), A. Salamon(2), G. Salina(2), F. Sargeni(3), A. Satta(2), S. Schrader(5), P. Steglich(5)

(1) University of Milan, Milan, Italy - (2) INFN Structure of Rome Tor Vergata, Rome, Italy - (3) University of Rome Tor Vergata, Rome, Italy

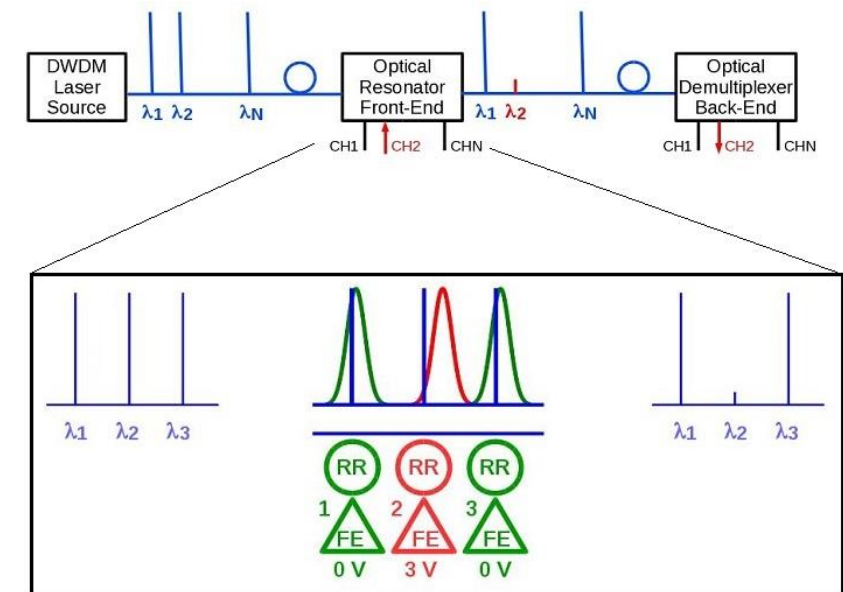
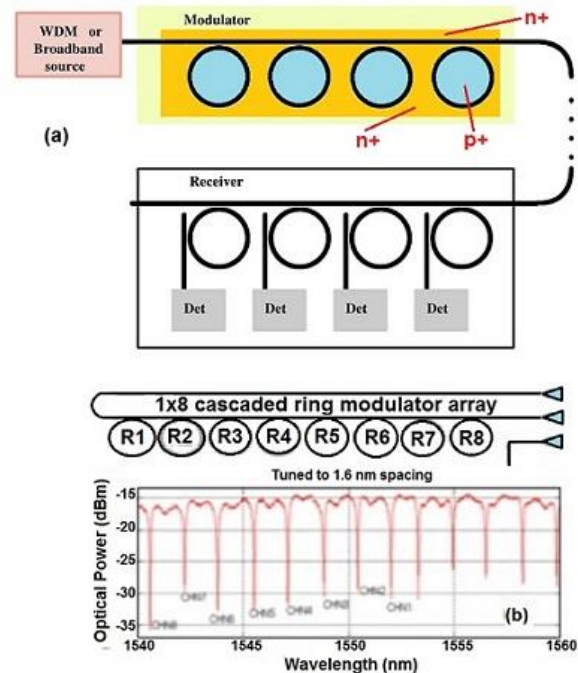
(4) IHP - Innovations for High Performance Microelectronics, Frankfurt (Oder), Germany – (5) Technical University of Applied Sciences, Wildau, Germany



We propose to use wavelength multiplexing on a silicon photonics circuit for highly segmented pixel detectors readout. Many front-end channels can be encoded and transmitted on the same common optical line and subsequently decoded by the back-end optical demultiplexer chip.



Each element will collect the signal from a **pixel detector**, **amplify and shape** the electrical pulse which will control a **ring resonator** tuned to its peculiar optical wavelength and coupled to a common **optical line**.



- no complex, power consuming digital electronics
- on-detector power consumption, interference and complexity reduction
- fast readout