

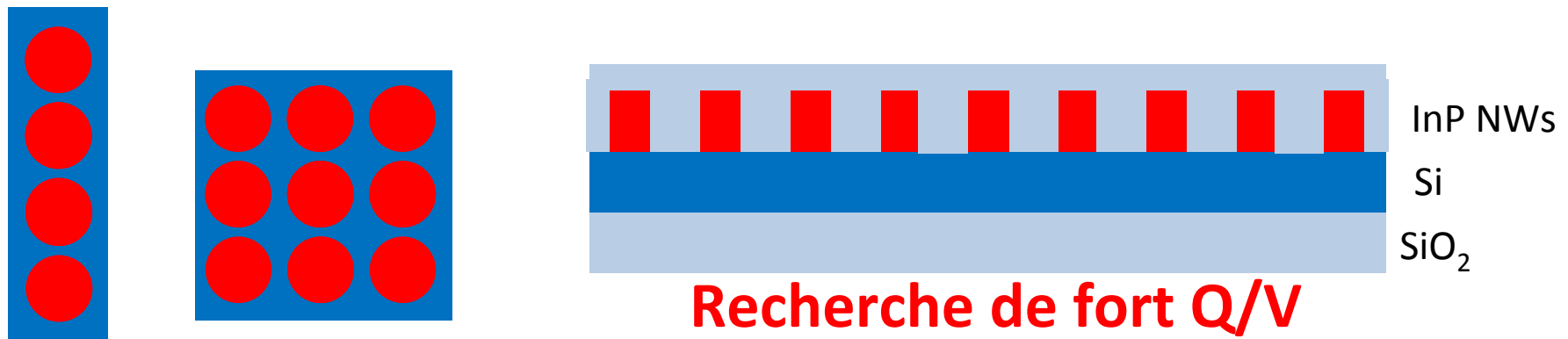
TASK 6: COUPLING OF NWS BASED PhC RESONATOR TO SOI WAVEGUIDE (INL, CEA-Leti / B. Ben Bakir)

The main objective of this task is to design and realize NWs based optical microsources (resonant LED-like structures or lasers)

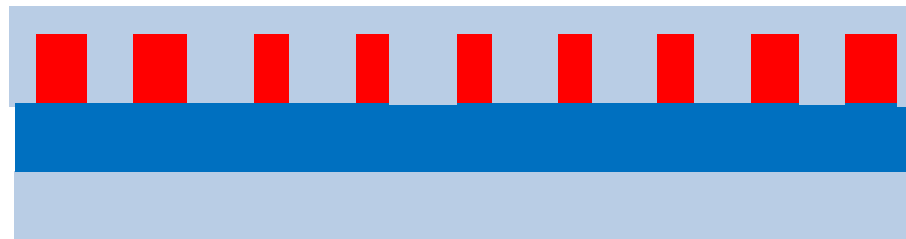
- T6 will be divided into 3 sub-tasks:
 - T6.1: Simulation of NWs based PhC resonators and of the coupling to a SOI waveguide (INL, CEA-Leti/ X.Letartre)
 - T6.2: Planarization of III-V NWs on waveguide (CEA-Leti/ H. Bono or B. Ben Bakir)
 - T6.3: Characterization of NWs-waveguide coupling (INL, CEA-Leti/ Ch. Seassal)

T6.1: Simulation of NWs based PhC resonators and of the coupling to a SOI waveguide (INL, CEA-Leti/ X.Letartre)

- modeling and design of micro-resonators based on a periodic array of III-V NWs/Si

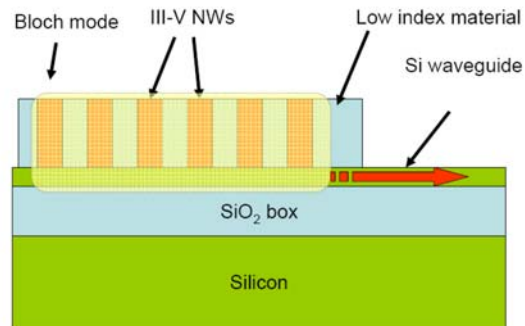


- réseau (PhC) 1D ou 2D
- exploitation d'un mode guidé (mixte) sous le cône
- contraintes technologiques: quelles limites sur les dimensions des piliers?
(hauteur, diamètre)
- confinement latéral par modification des diamètres des piliers extérieurs :

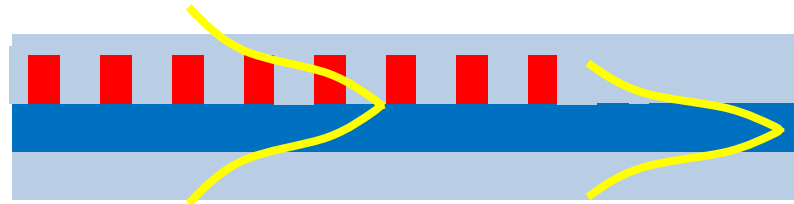


T6.1: Simulation of NWs based PhC resonators and of the coupling to a SOI waveguide (INL, CEA-Leti/ X.Letartre)

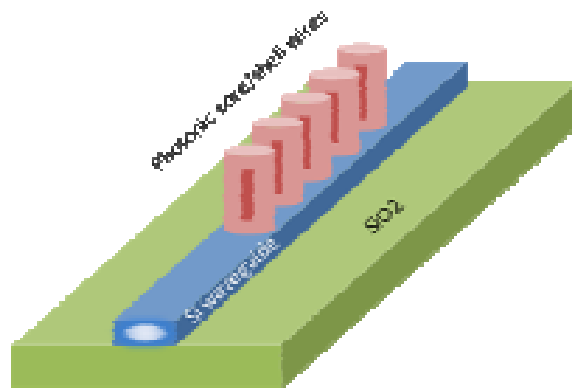
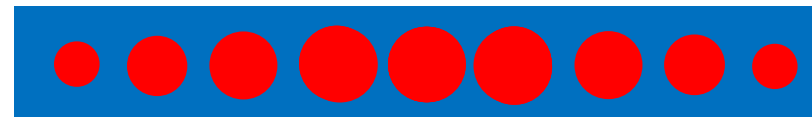
- simulation of the coupling between these micro- resonators and a SOI waveguide



- éviter les pertes par diffraction

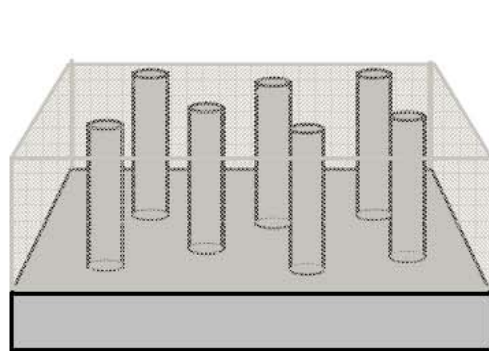


- exemple: exploiter les NWs pour faire un taper d'adaptation

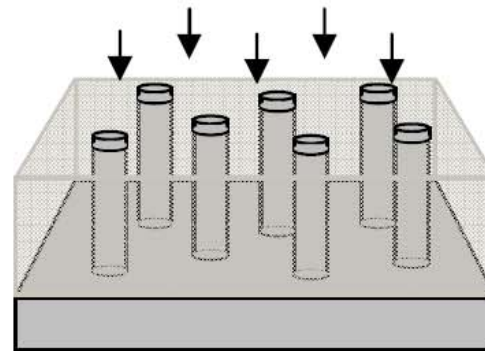


T6.2: Planarization of III-V NWs on waveguide (CEA-Leti/ H. Bono or B. Ben Bakir)

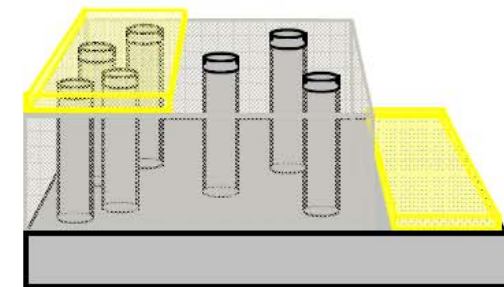
- The goal of this task is to embed the NWs within a low index material. This way, the demonstrators will include protected NWs, with a topography, and an optical environment as close as possible to the longer term target, i.e. electrically injected devices (out of the scope of the project)



i. CMP planarization



ii Rie etching



iii. metal deposition

T6.3: Characterization of NWs-waveguide coupling (INL, CEA-Leti/Ch. Seassal)

- *The fabricated structures will be characterized under optical pumping, in order to investigate the emission properties of the NWs, and the efficiency of the optical coupling into the SOI waveguides. First measurements will be done before the planarization step corresponding to Task 6.2, to serve as reference data. More advanced measurements will be performed after planarization, providing in-depth investigation of the devices.*



leti

LABORATOIRE D'ÉLECTRONIQUE
ET DE TECHNOLOGIES
DE L'INFORMATION

CEA-Leti
MINATEC Campus, 17 rue des Martyrs
38054 GRENOBLE Cedex 9
Tel. +33 4 38 78 36 25

www.leti.fr



Thanks for your attention



énergie atomique • énergies alternatives

