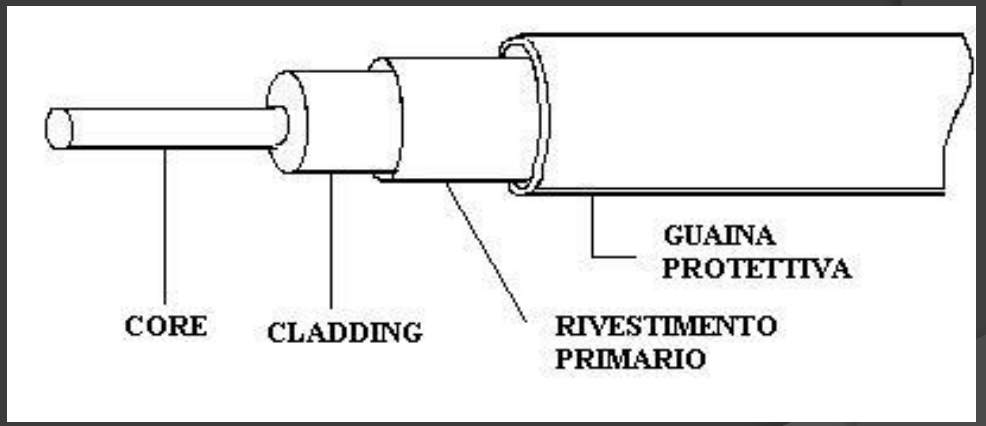
Dispositivi Ottici per ICT

In questo corso ci siamo occupati della creazione e dell'osservazione di guide d'onda sfruttando i principi base dell'ottica guidata.

I vantaggi dell'ottica guidata

- Permettono il passaggio di più segnali contemporaneamente (no interferenza)
- Trasmettono segnali più velocemente (anche 100 Gb/s)
- Hanno materiali più leggeri (costi più bassi)
- Basso consumo di energia

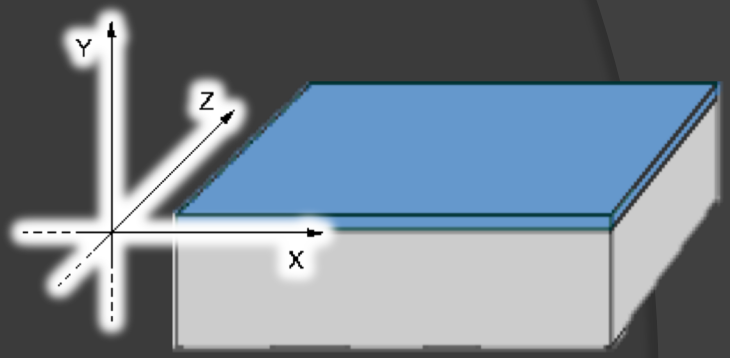


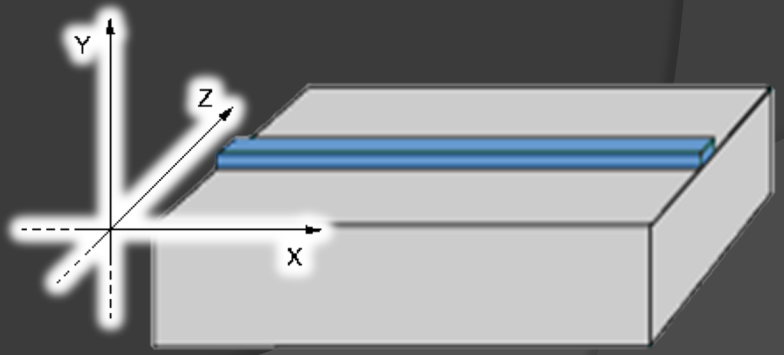
Guide d’onda

Una guida d’onda è un dispositivo finalizzato a condurre la luce.

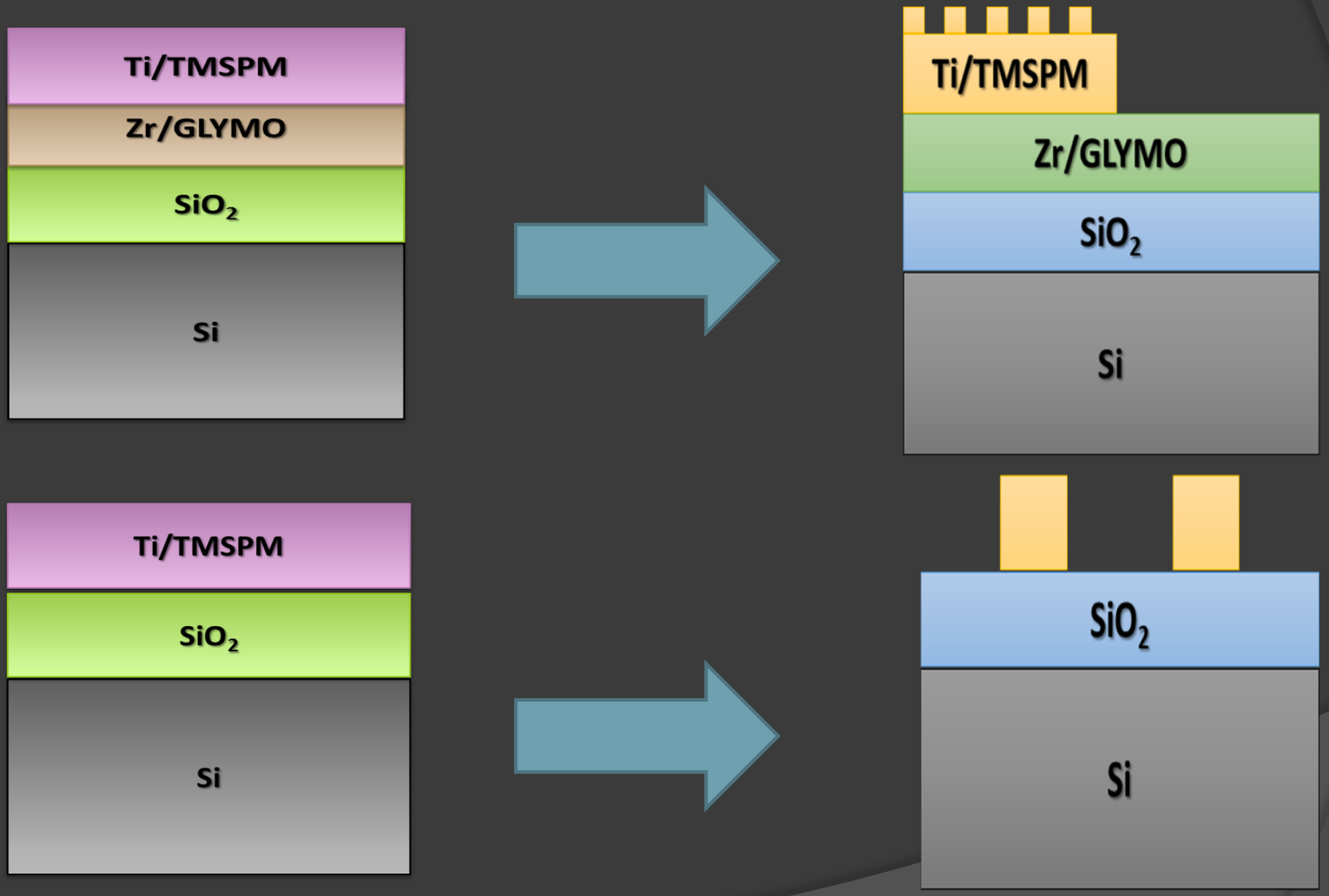
Guide planari: la luce è confinata in un’unica dimensione (asse y)

Guide Canali: la luce è confinata in due dimensioni (asse y, z)





REALIZZAZIONE DELLE GUIDE

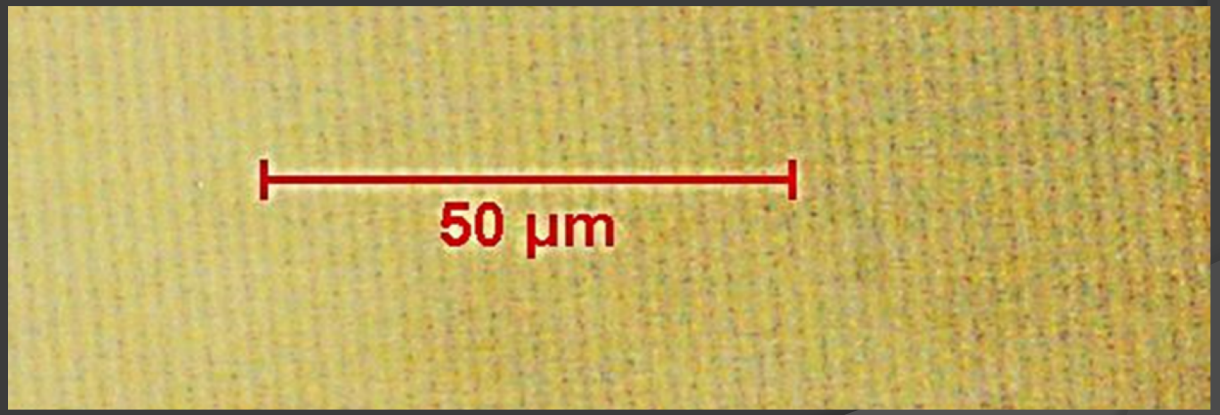


MISURA DEL PASSO RETICOLARE

Lo scorso anno lo abbiamo misurato ricorrendo alla legge di Bragg (trigonometria) e al microscopio ottico.

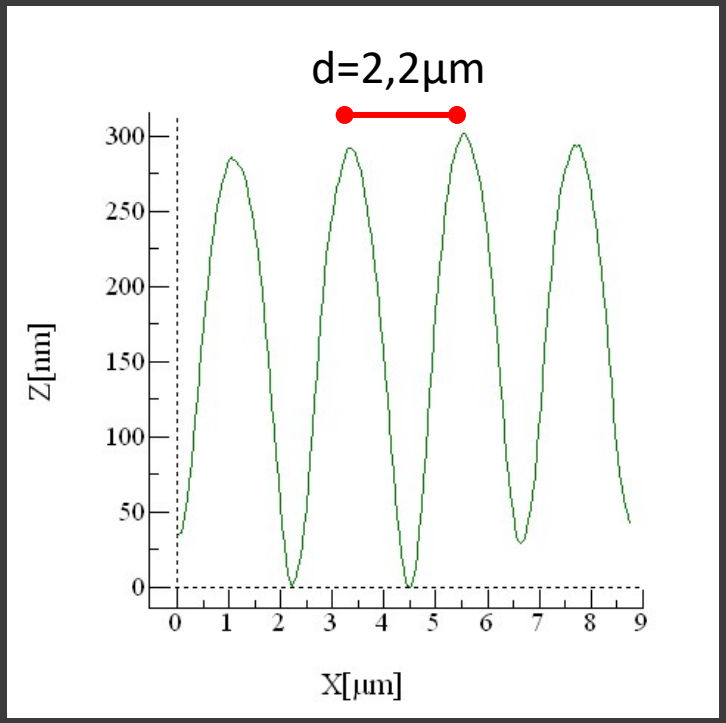
Con i calcoli: valore medio D = (2.04 ± 0.02) μm

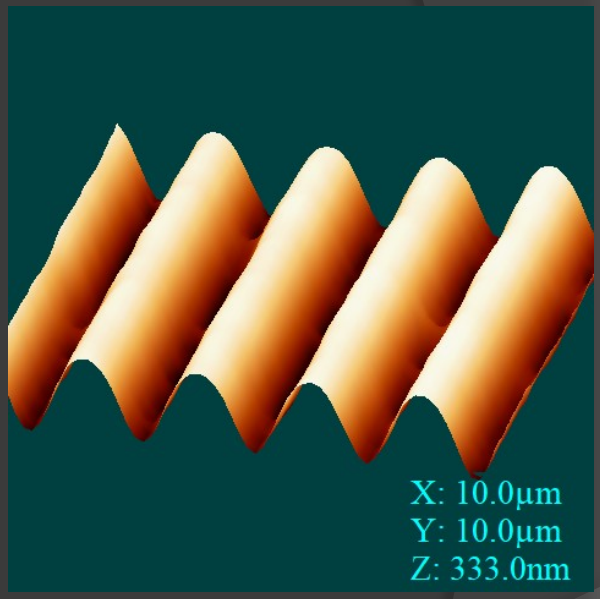
Nella foto abbiamo una sezione di 50 μm in cui si osservano 25 linee del reticolo di diffrazione, così da ricavare un passo reticolare di circa 2 μm.

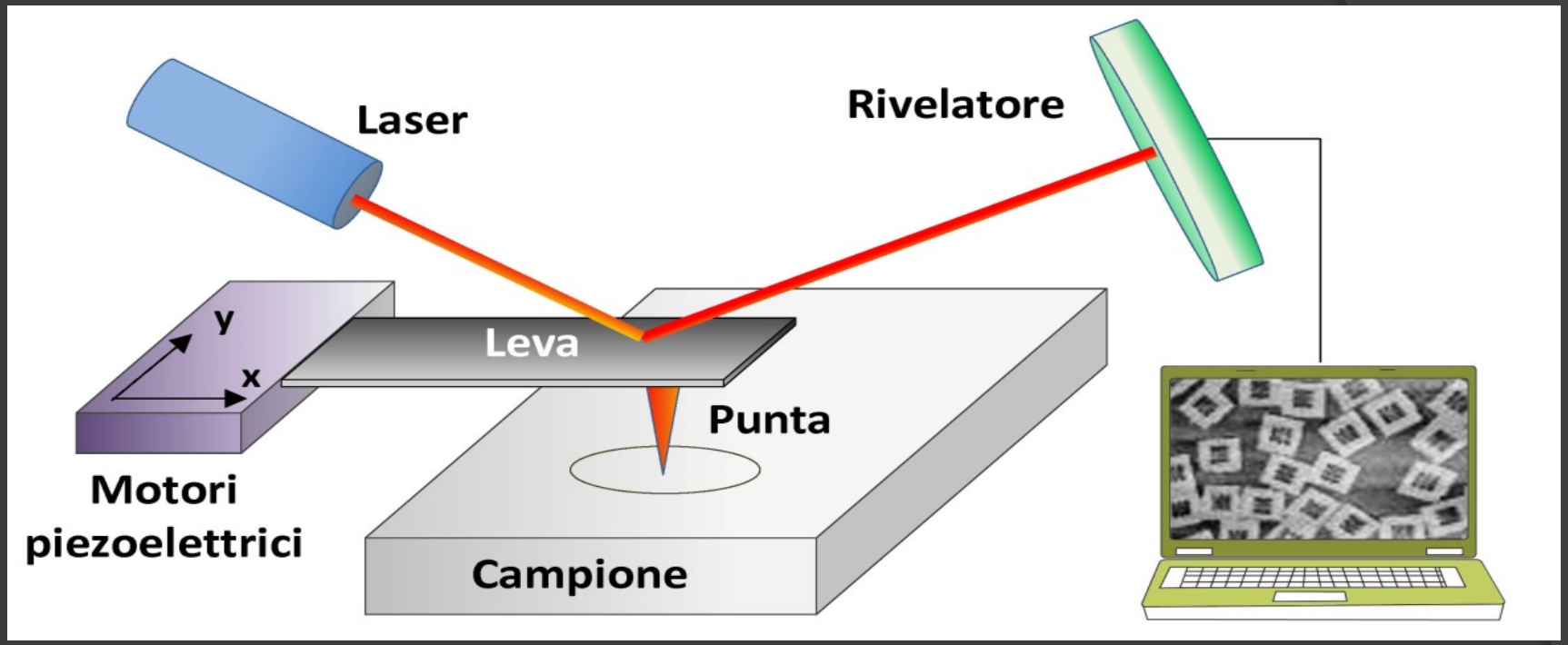


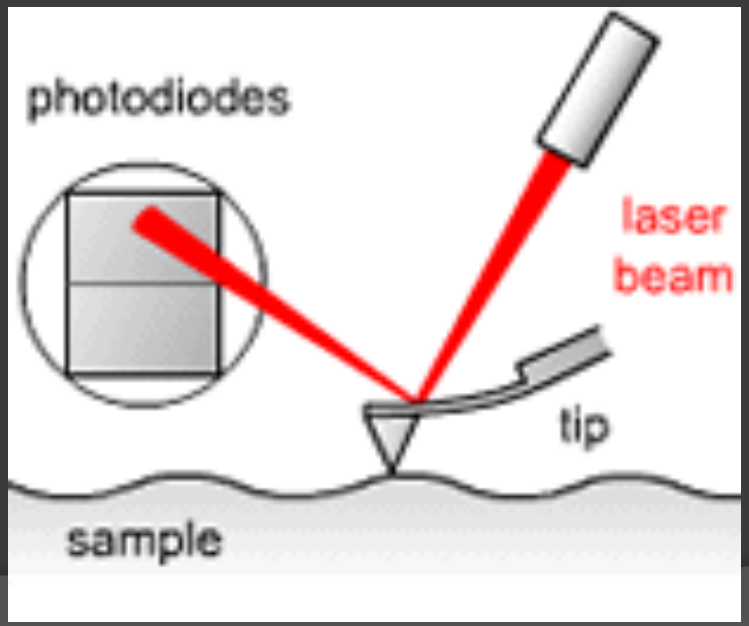
MISURA CON AFM

Quest'anno abbiamo confrontato i risultati dell'anno precedente con quelli ottenuti con il microscopio AFM.

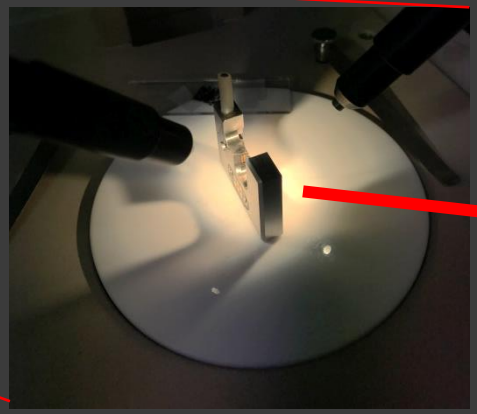


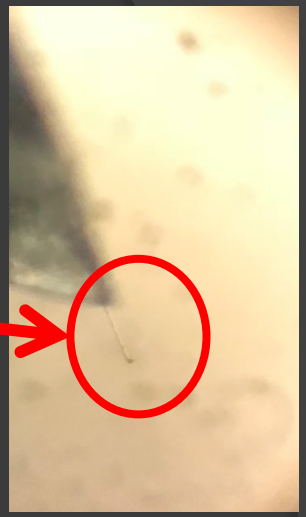




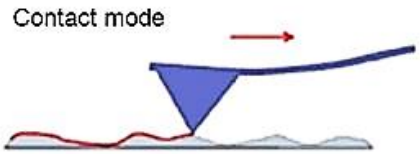


MICROSCOPIO AFM (Atomic Force Microscopy)

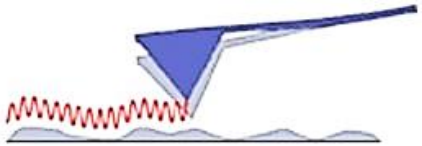




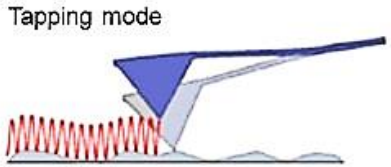
1. Contact mode



2. Non-contact mode

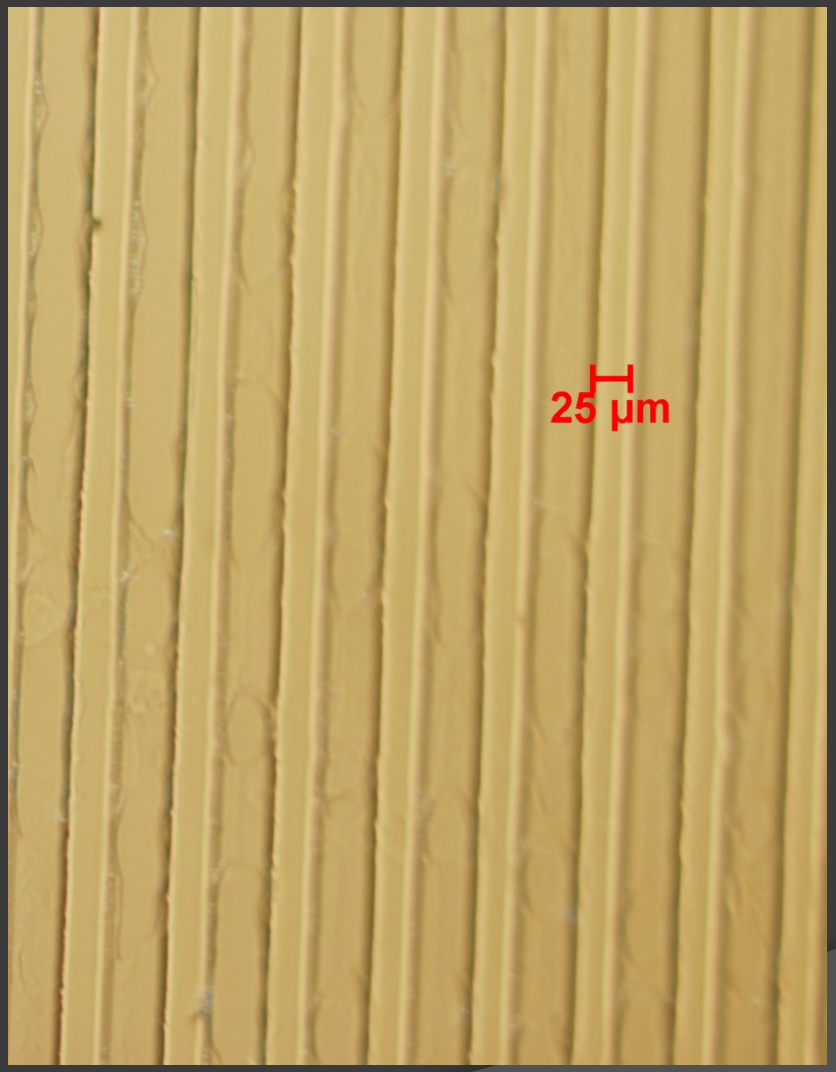


3. Tapping mode



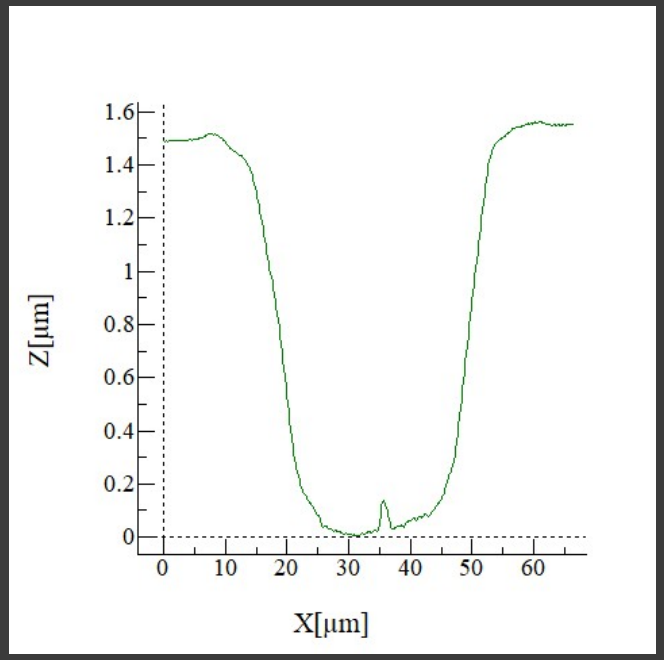
MISURA DELLA GUIDA CANALE

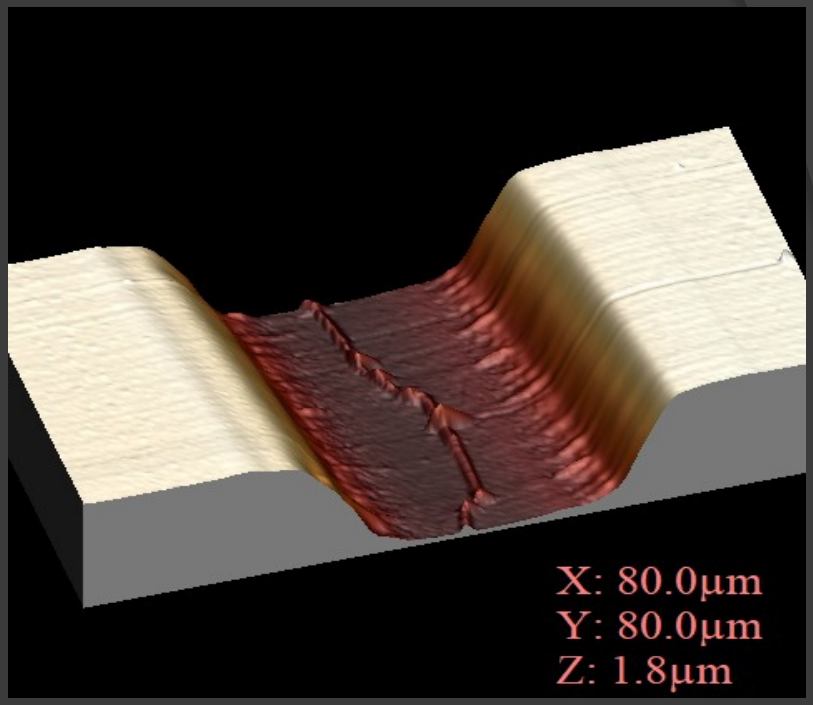
Misura della guida canale (microscopio ottico)

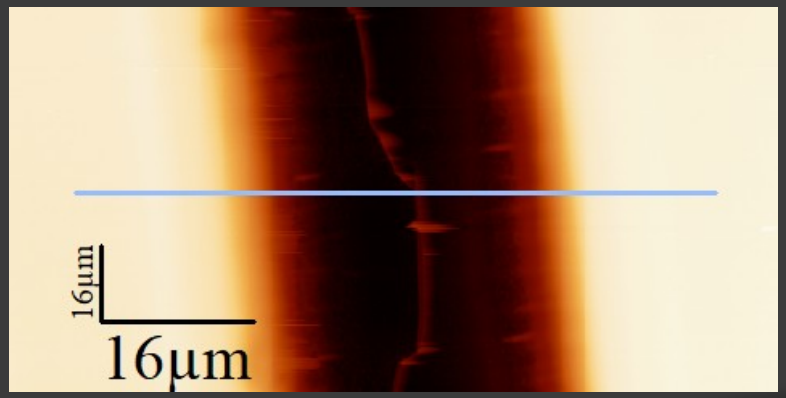


Guida canale: 25µm
Varco tra le guide: 40µm

Guida canale (AFM)

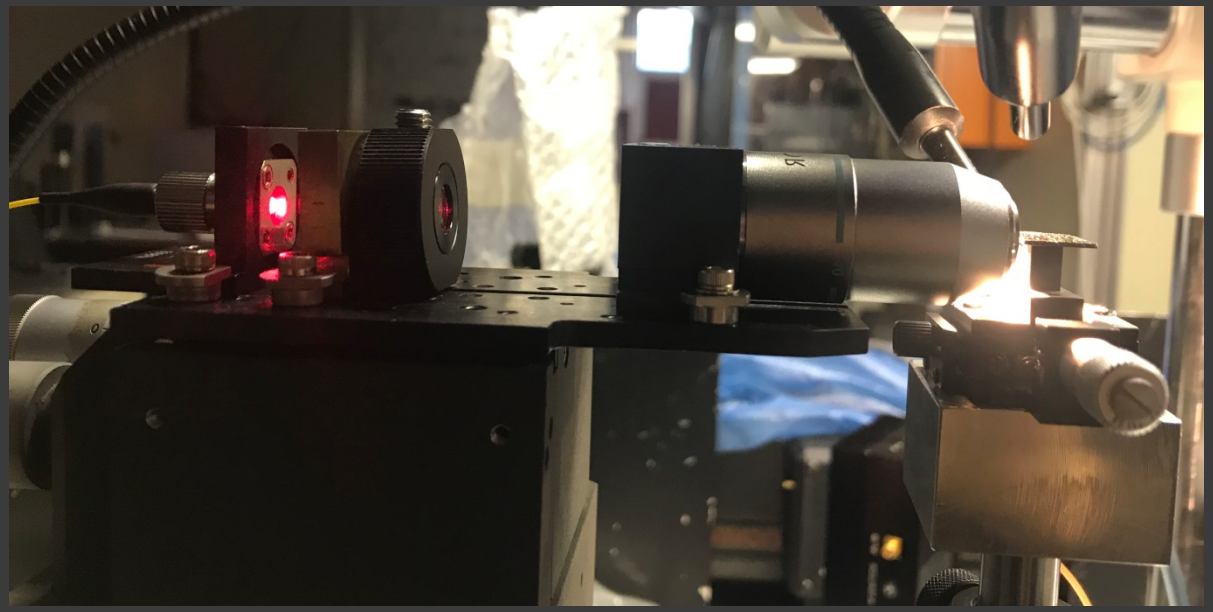


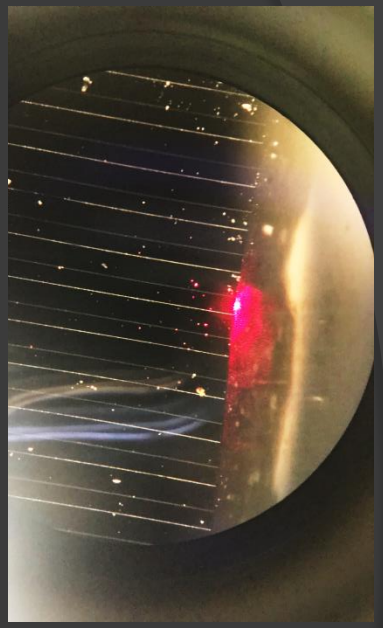


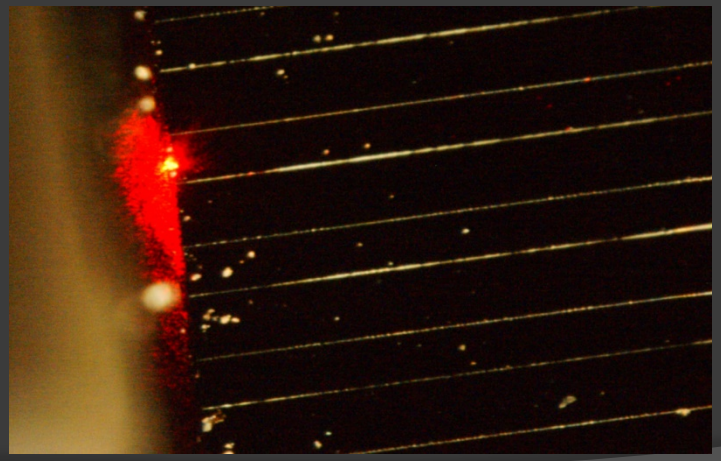


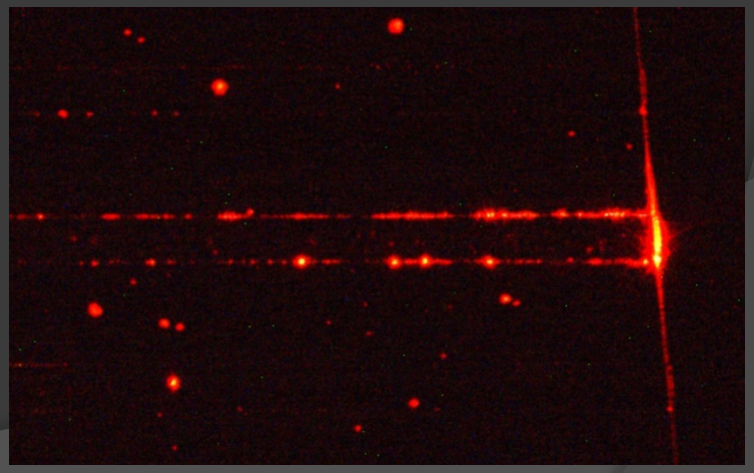
Larghezza del varco tra le guide: 40µm
Altezza delle guide: 1.5µm

Accoppiamento della luce nella guida canale









Barbato Hermann

Leoni Erica

Maione Cozzolino Asia

Micaloni Mattia

Nizi Giacomo

Timperi Erika

GRAZIE

Paolo Prosposito
Fabio De matteis
Anna Sgarlata
Ernesto Placidi