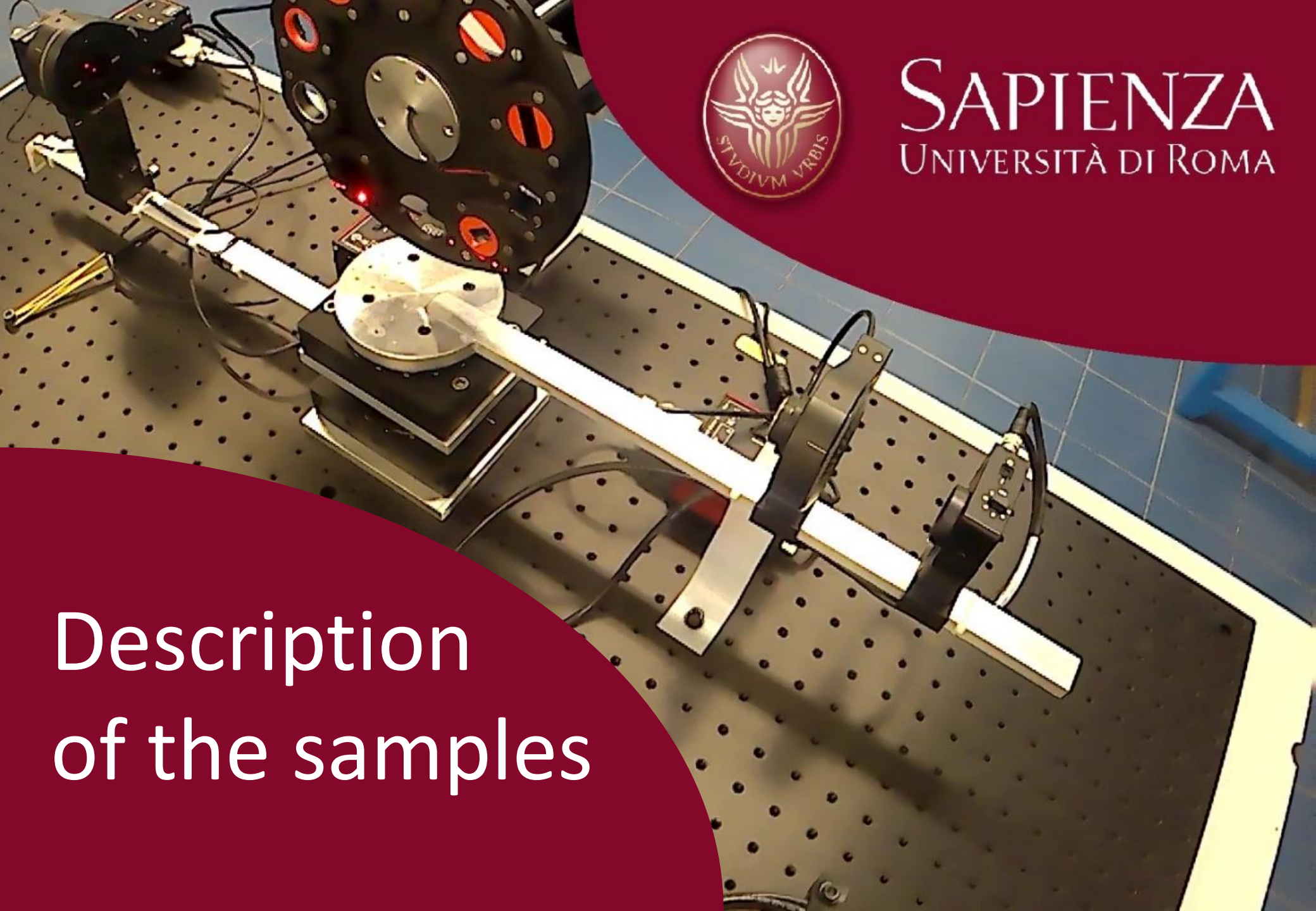




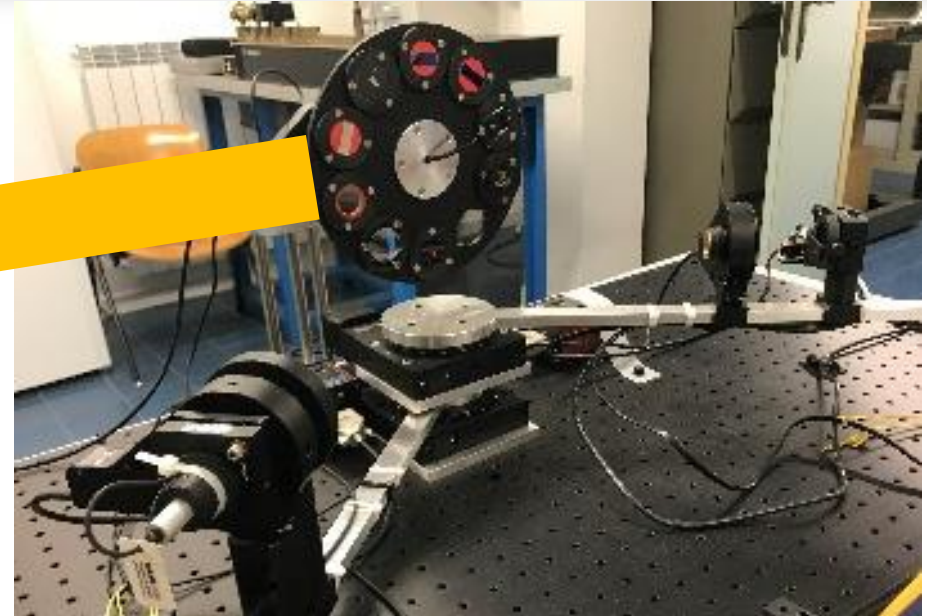
SAPIENZA
UNIVERSITÀ DI ROMA

Description
of the samples





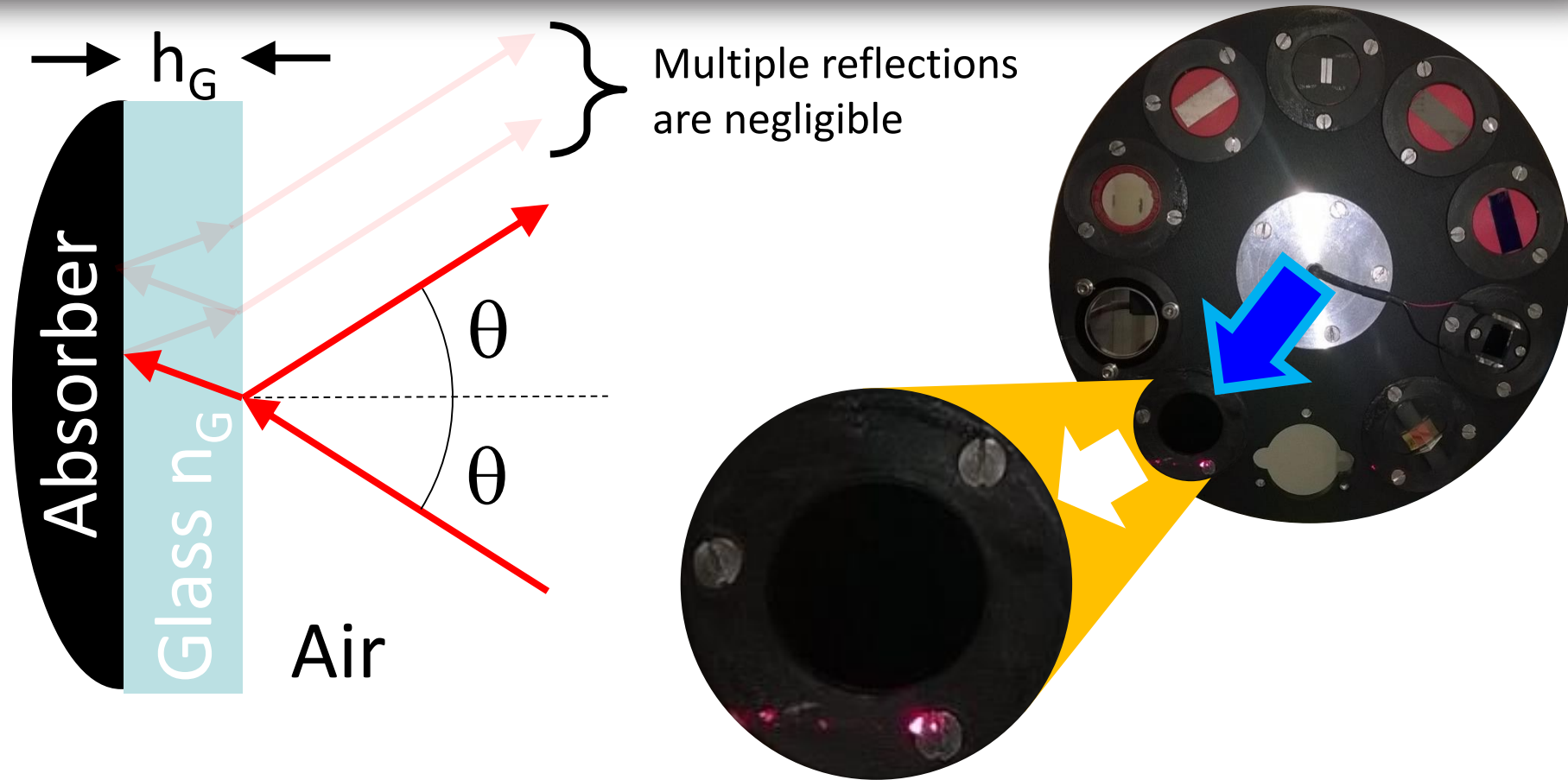
9 samples mounted on a rotating wheel



- The remotely controlled ellipsometer is equipped with 9 samples mounted on a rotating wheel
- Upon selection of one sample, the wheel is automatically rotated to position the selected sample along the path of the laser beam
- An empty space is used to perform transmittance measurements and calibration



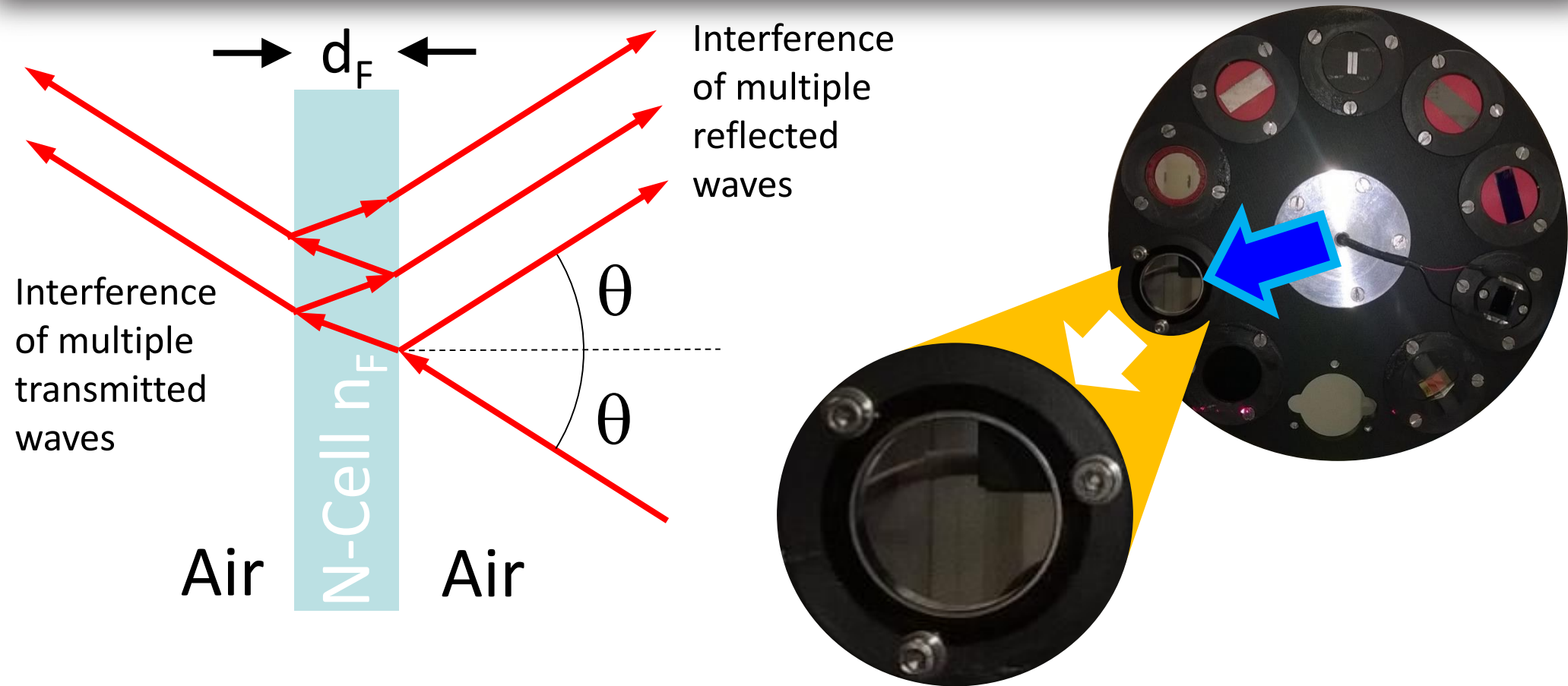
Slot 1 – Single AIR / GLASS Interface



- The back face of a thick glass ($h_G = 1$ mm) plate was painted with a black nail-polish to minimize multiple reflections, which can be neglected
- The refractive index of the glass is about $n_G = 1.47$ at $\lambda = 637$ nm



Slot 2 – Thick membrane



- The membrane is a nitrocellulose film (N-Cell) with refractive index about $n_F = 1.50$ at $\lambda = 637 \text{ nm}$ and thickness about $d_F = 5 \mu\text{m}$
- The membrane is a commercial uncoated pellicle beamsplitter (Thorlabs)



Slot 3 – ITO thin film on Glass

Interference of multiple reflected waves

Interference of multiple transmitted waves

Air Glass n_G ITO n_{ITO} Air

d_{ITO}

θ

θ

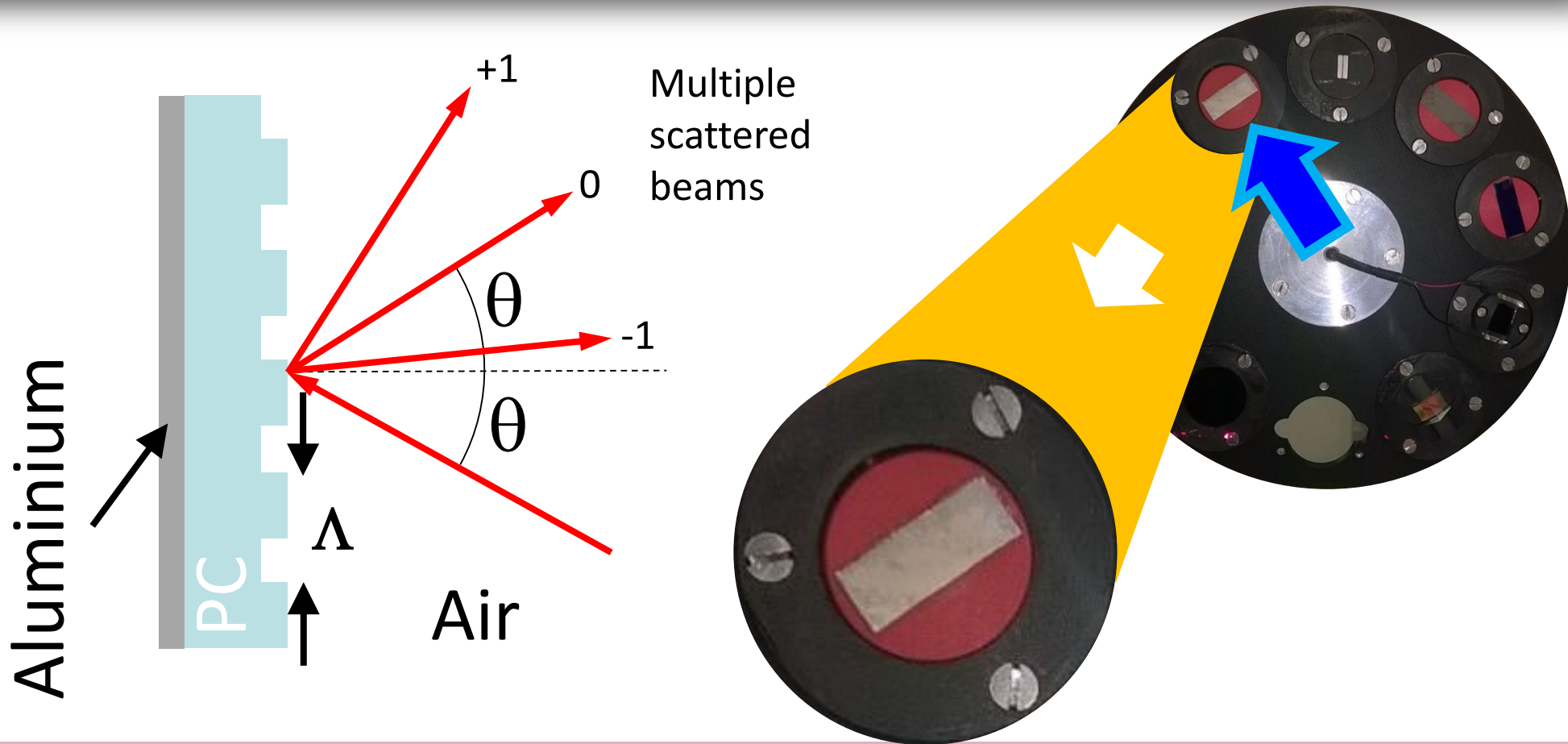
ENECA

Courtesy of ENEA
C.R. Casaccia

- The indium tin oxide (ITO) thin film has refractive index about $n_{ITO} = 1.78$ at $\lambda = 637$ nm and thickness about $d_{ITO} = 600$ nm
- The glass substrate is of the same type as in the Slot 1



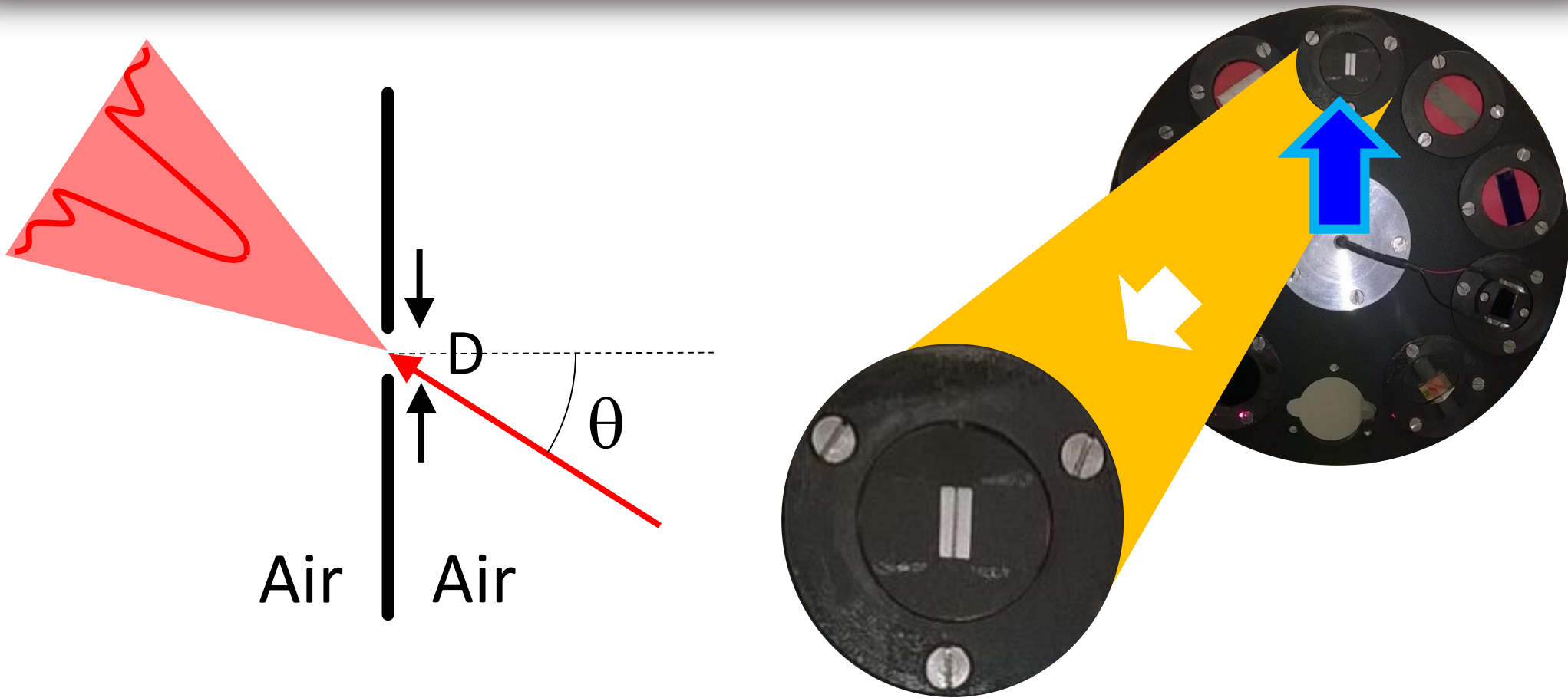
Slot 4 – Diffraction grating (part of a CD)



- The poly-carbonate (PC) substrate is engraved with lines with period $\Lambda = 1.6 \mu\text{m}$. The grating lines are perpendicular to the incidence plane
- The sample was cut from a standard compact disk



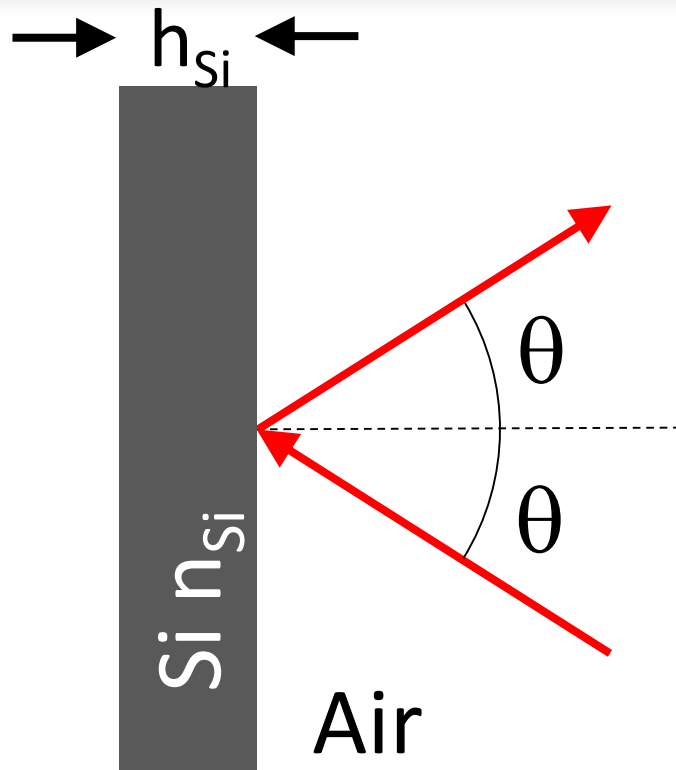
Slot 5 – Single Linear Slit



- The slit is constituted by two razor blades at an unknown distance D



Slot 6 – 100 Silicon wafer

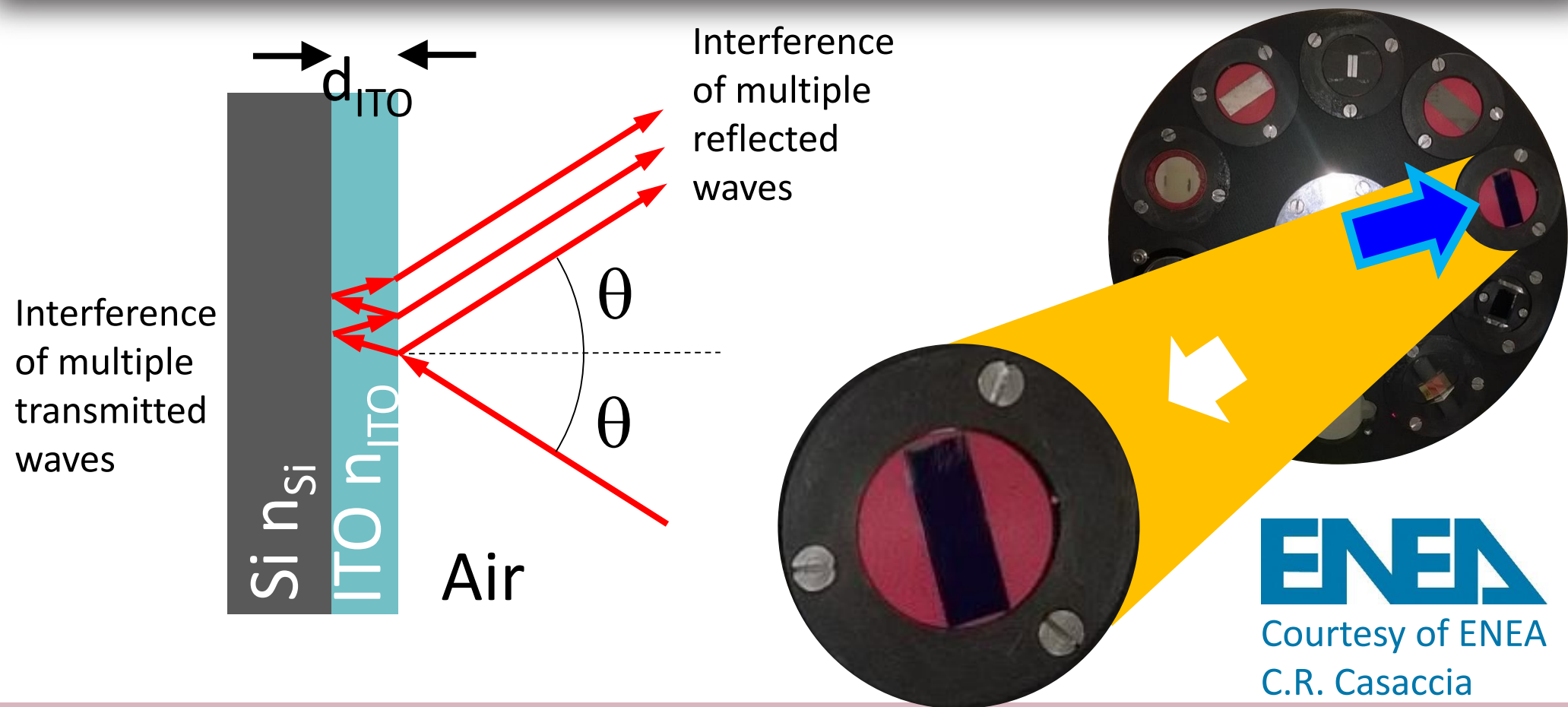


ENEA
Courtesy of ENEA
C.R. Casaccia

- 100 Silicon wafer with thickness $h_{Si} = 250 \mu\text{m}$ and refractive index about $n_{Si} = 3.88$ at $\lambda = 637 \text{ nm}$
- Due to the absorption at $\lambda = 637 \text{ nm}$ multiple reflections are absent



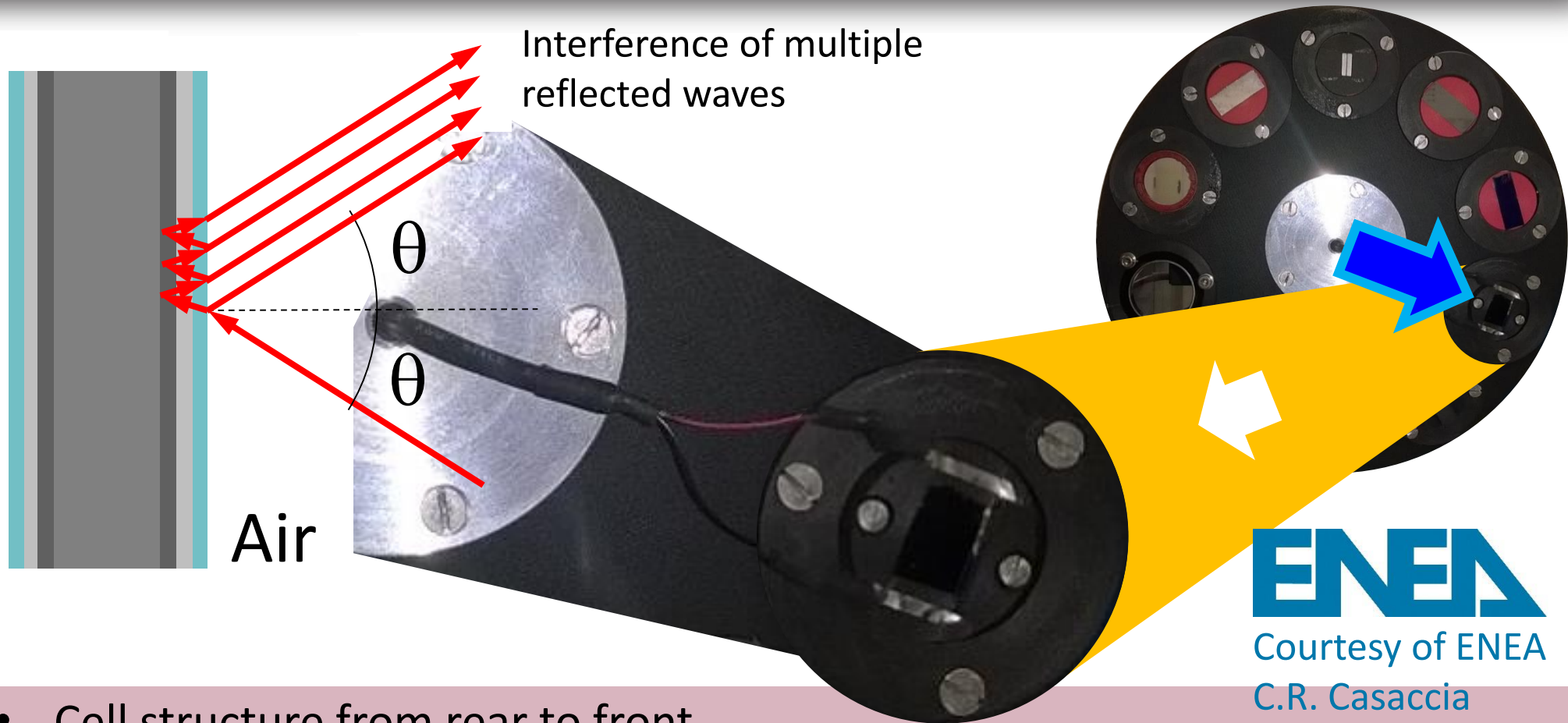
Slot 7 – ITO thin film on a 100 Silicon wafer



- The indium tin oxide (ITO) thin film has refractive index about $n_{ITO} = 1.78$ at $\lambda = 637$ nm and thickness about $d_{ITO} = 600$ nm
- The 100 Silicon wafer is the same as in the slot 6



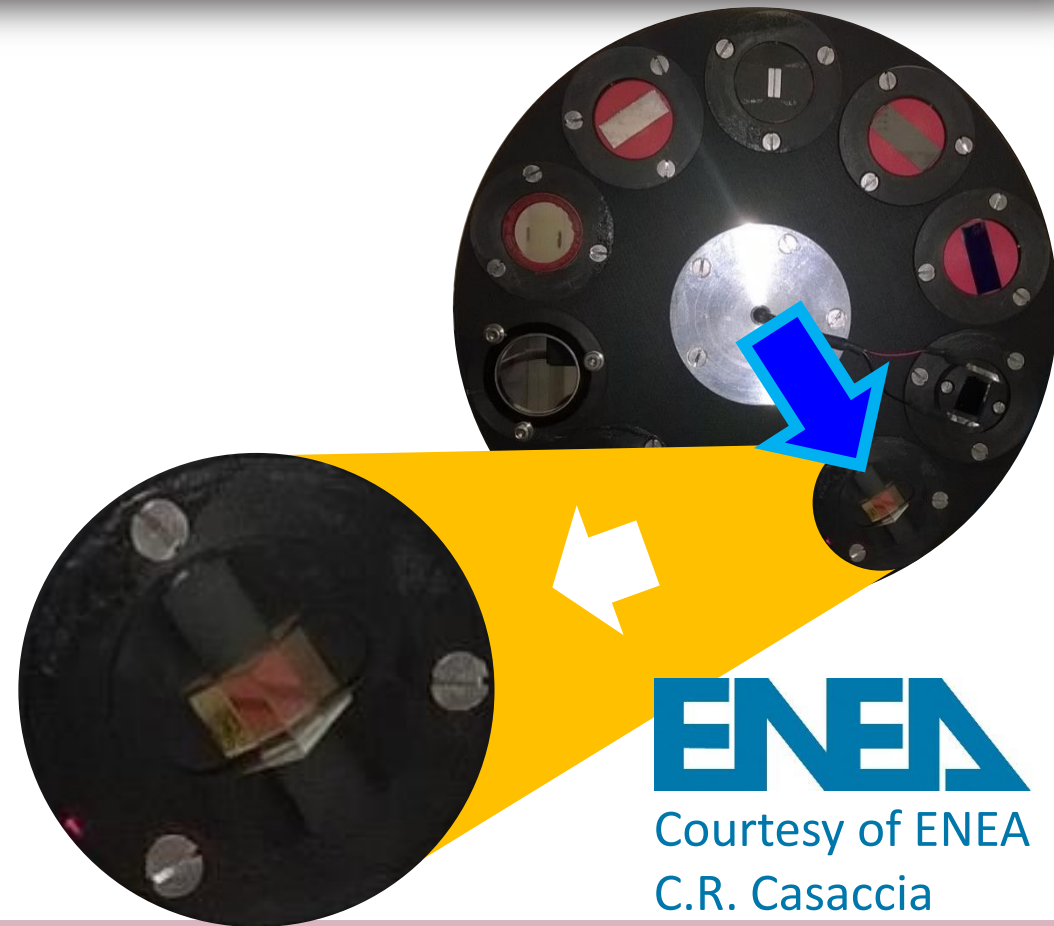
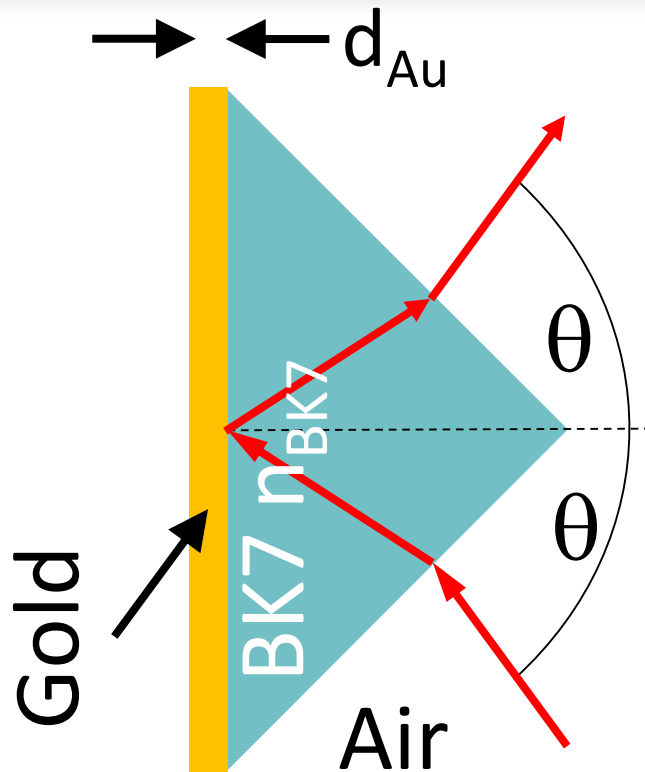
Slot 8 – Amorphous Silicon Solar Cell



- Cell structure from rear to front
ITO (80 nm) / n-doped amorphous Si (a:Si) (10 nm) / intrinsic a:Si (5 nm) / n-doped Si wafer (250 μm) / intrinsic a:Si (5 nm) / p-doped a:Si (5 nm) / ITO (80 nm)
- Photo-voltaic current measured by means of the two red/black wires



Slot 9 – Gold coated prism



ENEA
Courtesy of ENEA
C.R. Casaccia

- The BK7 glass prism has refractive index $n_{BK7} = 1.515$ at $\lambda = 637$ nm
- The Gold layer has thickness about $d_{Au} = 45$ nm and complex refractive index about $n_{Au} = 0.18 + i 3.45$