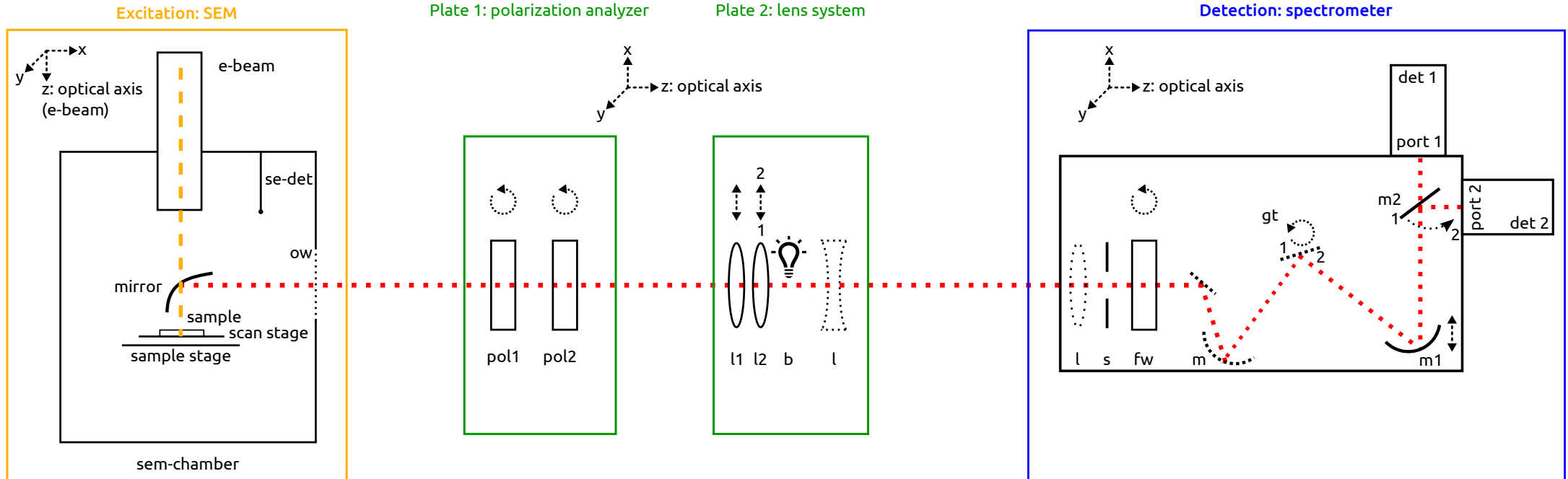# SPARCv2: angle resolved polarimetry (SPARCv2-ARPOL) setup

legend:
——— : passive components
     : active components
italic : component roles in odemis
* : component not shown

Excitation: SEM

x
y
z: optical axis (e-beam)

e-beam
se-det
ow
mirror
sample
scan stage
sample stage
sem-chamber

Plate 1: polarization analyzer

x
z: optical axis
y

pol1 pol2

Plate 2: lens system

x
z: optical axis
y

2
1

l1 l2 b l

Detection: spectrometer

x
z: optical axis
y

det 1
port 1
m2
1 2
port 2
det 2
gt
1 2
l s fw m
m1

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ebeam: electron beam of the scanning electron microscope (SEM)
role: e-beam
role: ebeam-focus (axes: z)

se-det: secondary electron detector
role: se-detector

mirror: parabolic mirror to collect the cathodoluminescence (CL) light emitted by the sample; mirror is engaged into the beam path using its short and long axes and the fine adjustments are done via the x-y-referential
role: mirror (axes: s (short axis) and l (long axis))

role: mirror-xy (axes: x, y)
sample stage (optional): microscope stage to position sample
role: stage (axes: x, y, z, rz)
scan stage (optional): second stage for fine adjustment
role: scan-stage (axes: x, y)

sem-chamber: vacuum chamber of microscope

ow: optical window, which is transparent for the CL light

polarization analyzer: module to analyze the polarization of the CL light
role: polarization-analyzer (axes: pol)
pol1: quarter wave plate
role: quarter-wave-plate (rz)
pol2: linear polarizer
role: linear-polarizer (rz)

l1: lens 1 position can be adjusted perpendicular to the optical axis; focuses the incoming collimated light
role: lens-mover (axes: x)
l2: lens 2 switched to position 1 ("on"); further focuses the light
role: lens-switch (axes: x)
b: light for spectrograph to calibrate the position offset between the two detectors the grating offset and the m1 position
role: brightlight
*optical path properties: contains parameters concerning the parabolic mirror and the lens system
role: lens
*power control unit: power supply for the components: det 1 and det 2 (depending on hardware), pol1, pol2, l1, l2, s1, spectrograph
role: power-control

l: additional non-moveable lens; functions as passive focusing optic

l: additional non-moveable lens; functions as passive focusing optic
s: slit not needed for ARPOL and therefore opened (position: "on")
role: slit-in-big (axes: x)

fw: rotatable emission filterwheel to select a specific wavelength band
role: filter (axes: band)
m: passive mirror collimates the light and redirects it towards grating turret
gt: switched to position 2 (mirror); redirects light to the detectors

m1: mirror to focus the light within the spectrograph on the detectors
role: focus (axes : z)
m2: mirror to switch between two detectors (position 1 and 2)
role: spec-det-selector (axes: rx)

det 1: detector 1 (pixelated detector)
role: ccd
det 2: detector 2 (pixelated detector) combines the slit (s) and the grating turret (gt)
to select the mirror or a combination of grating and center wavelength

role: spectrograph (axes: wavelength, optional: slit-in, grating)
In ARPOL no axis "slit-in" as slit is switched to "on" (slit-in-big)
In ARPOL mirror is selected via axis "grating" and axis "wavelength" is therefore 0
spectrometer 1: combines the component spectrograph and detector 1
role: spectrometer-integrated
spectrometer 2: combines the component spectrograph and detector 2