



# SP B.1 - Results from BiGyM and sample needs

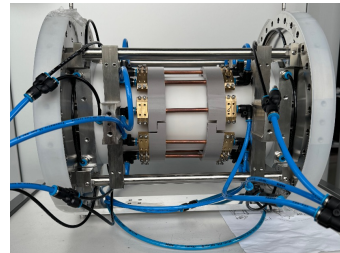
|                         | GyM                    | BiGyM                    |
|-------------------------|------------------------|--------------------------|
| $n_e [m^{-3}]$          | $10^{15} - 10^{17}$    | $10^{18} - 10^{19}$      |
| $\Gamma [m^{-2}s^{-1}]$ | $10^{21}$              | $10^{22} - 10^{23}$      |
| Sources                 | 2 magnetrons @2.45 GHz | 2 RF antennas @13.56 MHz |
| $P_{in} [kW]$           | 4.5                    | 20                       |



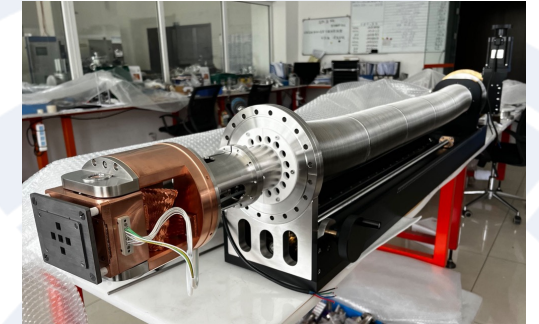
SWISS PLASMA  
CENTER

Birdcage  
antennas

Helicon wave  
plasma

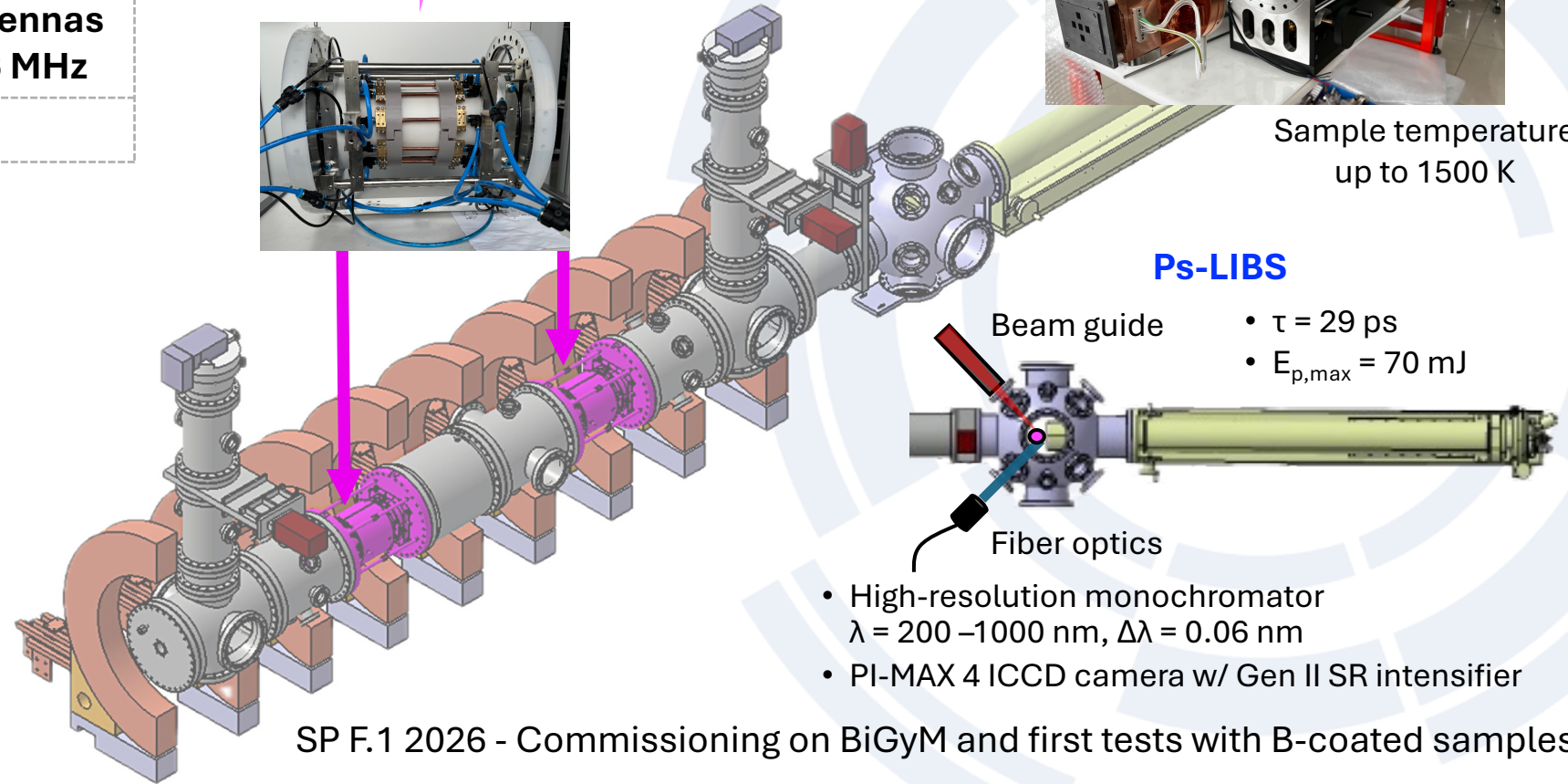


New sample exposure system



Sample temperature  
up to 1500 K

- New plasma sources
- New sample exposure system
- Picosecond-laser induced breakdown spectroscopy (ps-LIBS)
  - Infrared camera
  - Upgrade of vacuum system:
    - pumps
    - pressure gauges
    - isolation valves
    - pressure control valves
- New CODAS and storage system



**First plasma is expected by June 2026. PWI experiments planned for the second half of 2026**



## SP B.1 - Results from BiGyM and sample needs

### Upgrade Status

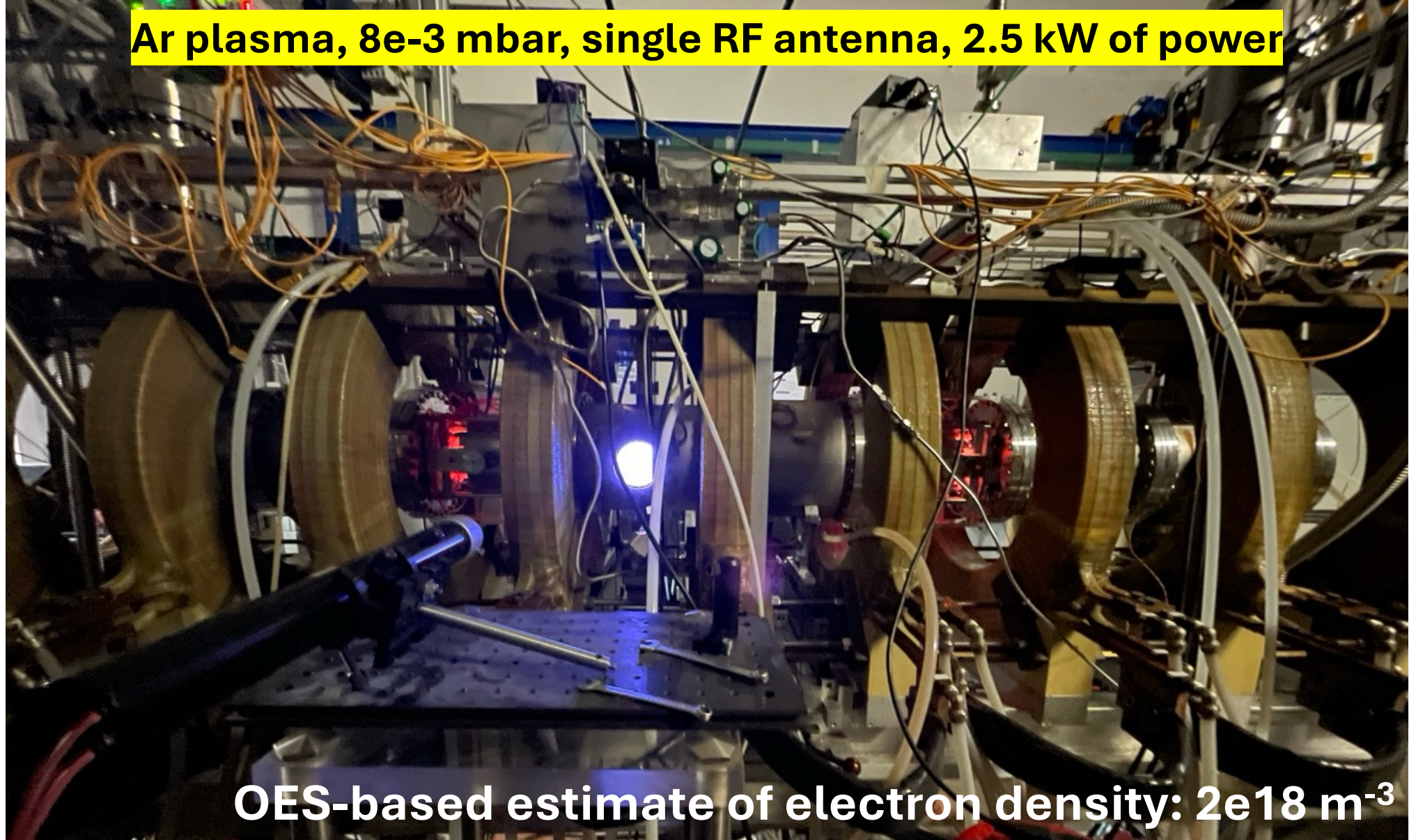
- Disassembly of GyM ✓
- Assembly of BiGyM vacuum vessel and repositioning of coils ✓
- Vacuum leak testing of the vessel (down to  $1\text{e-}7$  mbar) ✓
- Installation of sample exposure system on BiGyM support structure ✓
- Installation of pumping lines, including gate valves (safety) and butterfly valves (pressure control) ✓
- System-wide vacuum leak testing ✓
- First plasma (in collaboration with SPC–EPFL): **30 June 2026** ✓
- Characterization of plasma parameters using optical emission spectroscopy





## SP B.1 - Results from BiGyM and sample needs

**Ar plasma,  $8 \times 10^{-3}$  mbar, single RF antenna, 2.5 kW of power**



**OES-based estimate of electron density:  $2 \times 10^{18} \text{ m}^{-3}$**



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- Vacuum leak testing of the vessel (down to 1e-7 mbar) ✓
- Installation of sample exposure system on BiGyM support structure ✓
- Installation of pumping lines, including gate valves (safety) and butterfly valves (pressure control) ✓
- System-wide vacuum leak testing ✓
- First plasma (in collaboration with SPC-EPFL): **30 June 2026** ✓
- Characterization of plasma parameters using optical emission spectroscopy 
- Connection of sample exposure system to BiGyM vacuum vessel: **by September 2026**

### First SP B.1 BiGyM PMI experiments on W/B reference layers like those exposed in GyM

- D plasma exposure of ns-PLD 100 nm-thick compact B films deposited on W substrates with PSI-2 geometry
  - $E_{\text{ion}} = 76 \text{ eV}$  according to PSI-2 experiments [M. Sackers, et al., Nucl. Mater. Energy **45** (2025) 102003]
  - $\Phi = 4 \times 10^{23} \text{ D}^+ \text{m}^{-2}$  to avoid full layer erosion