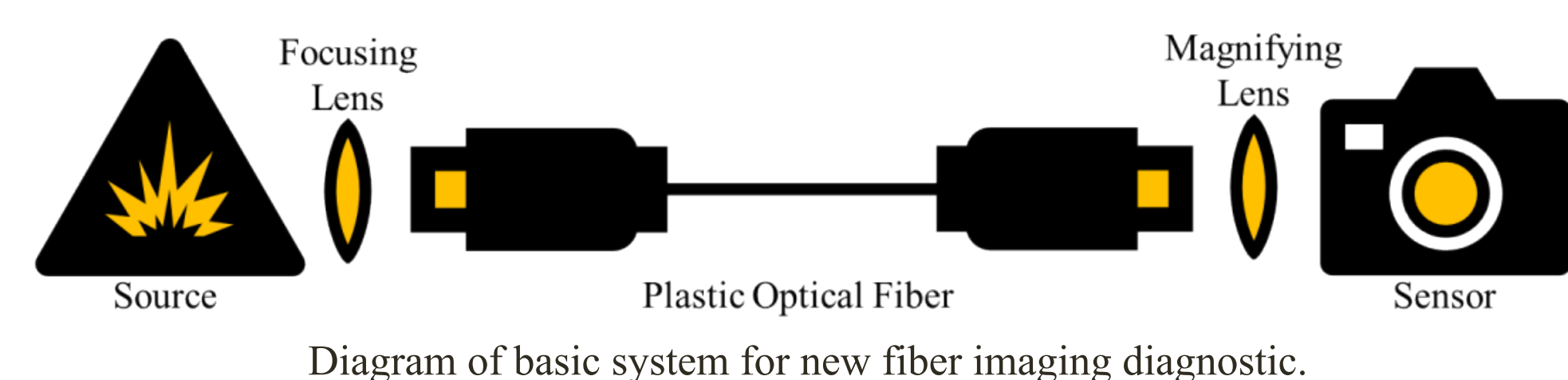


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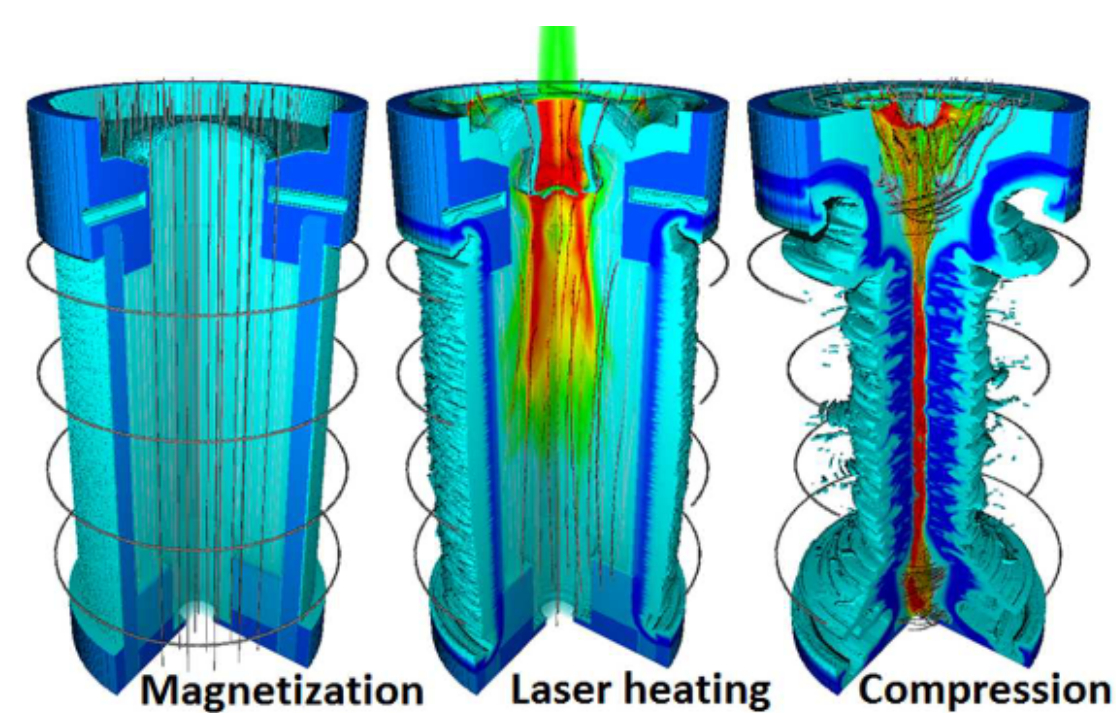
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MagLIF on Z

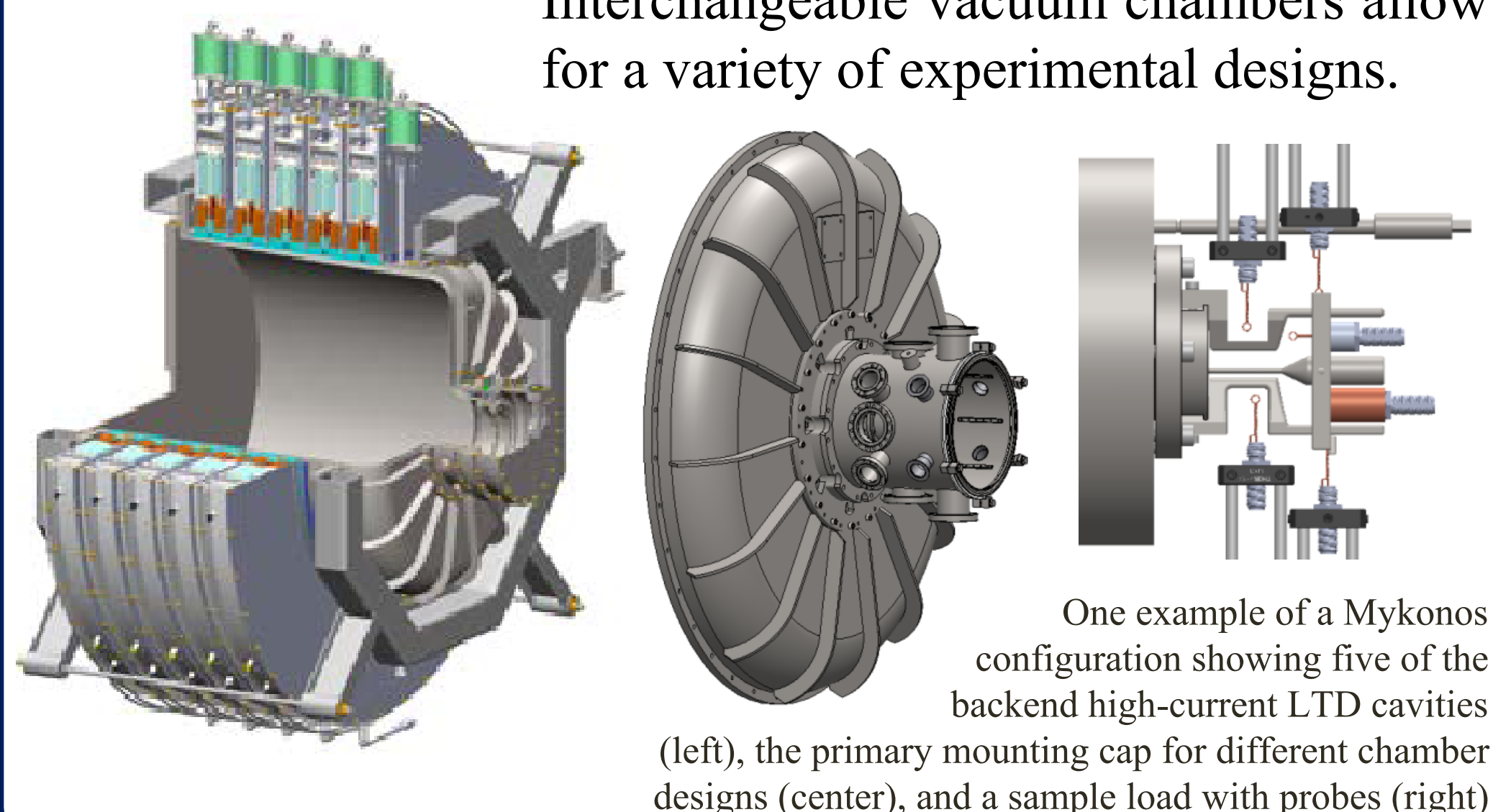
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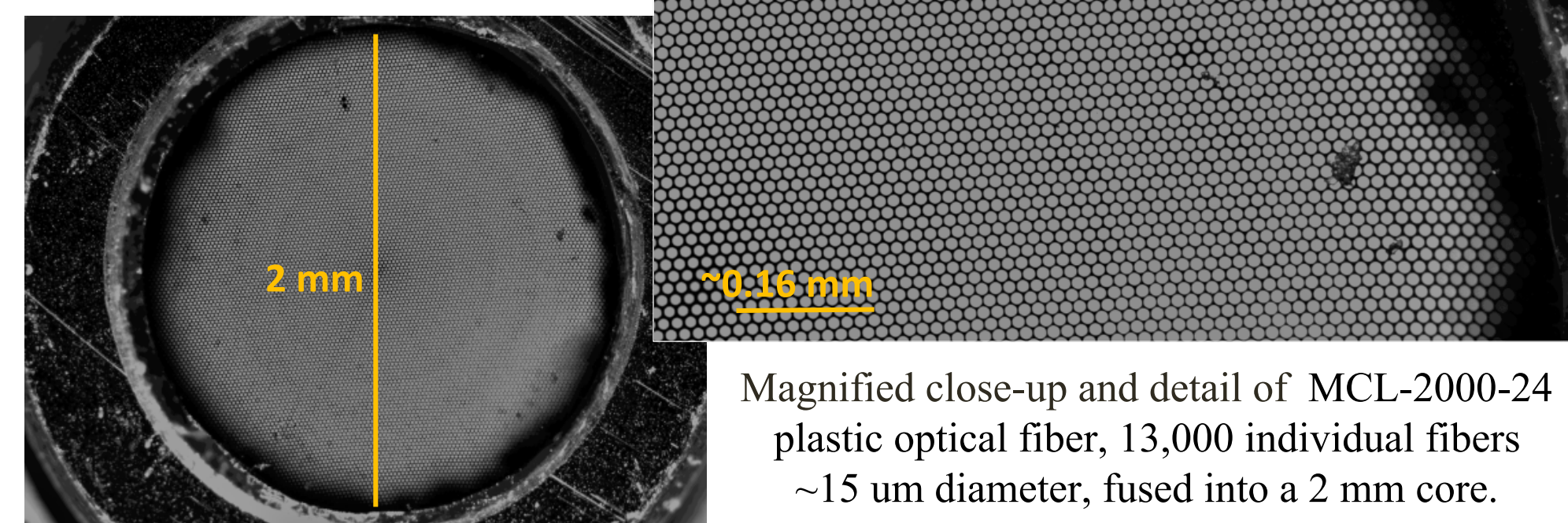
Interchangeable vacuum chambers allow for a variety of experimental designs.



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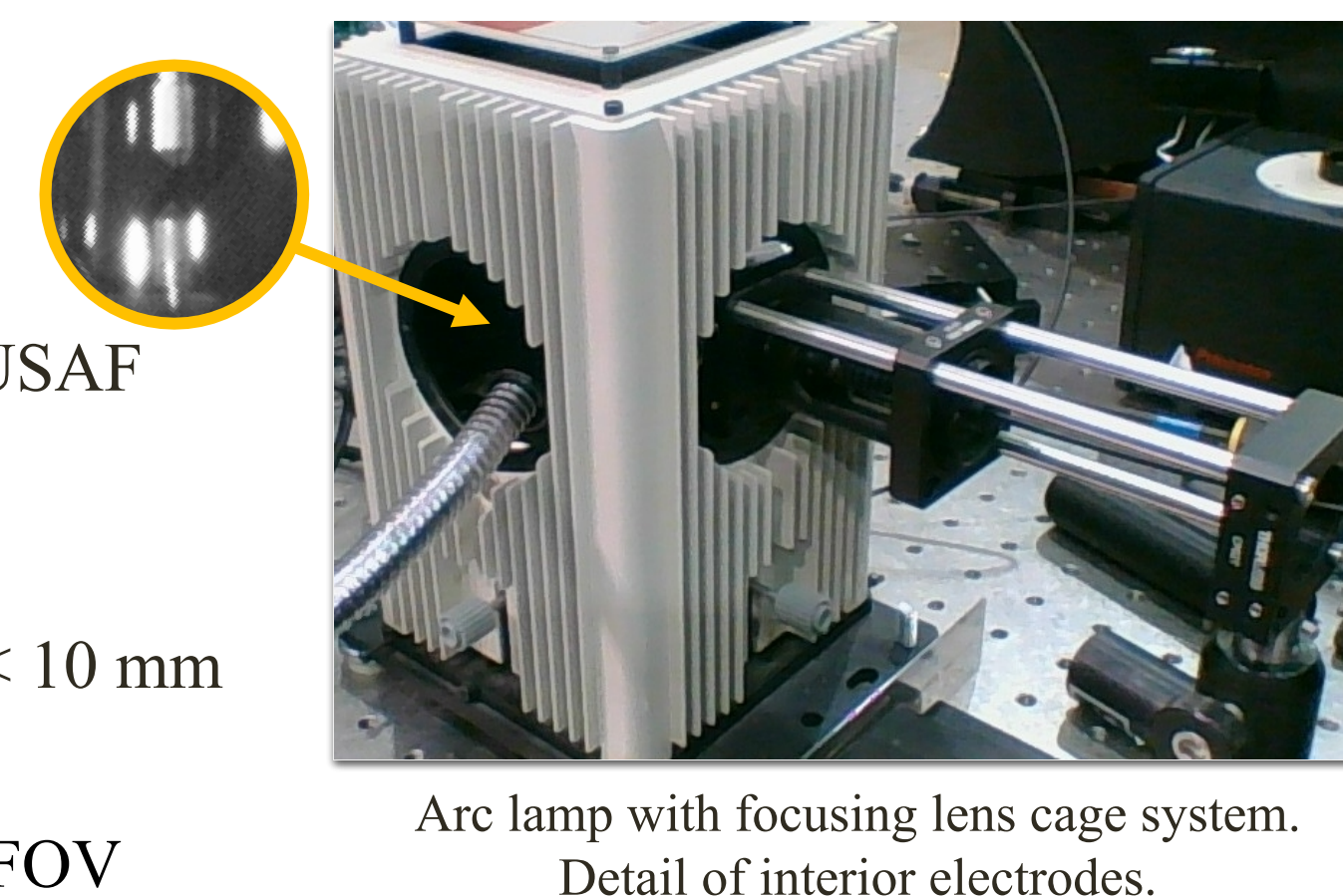
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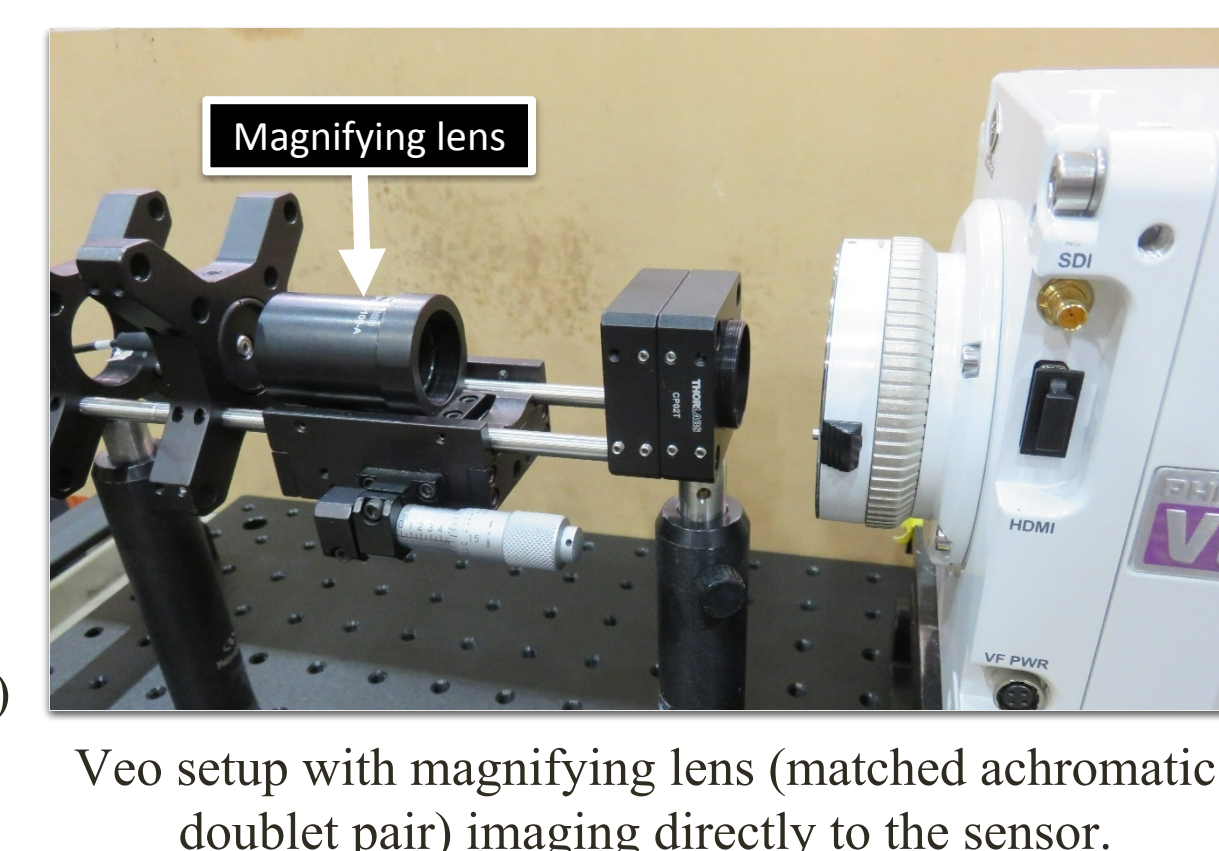
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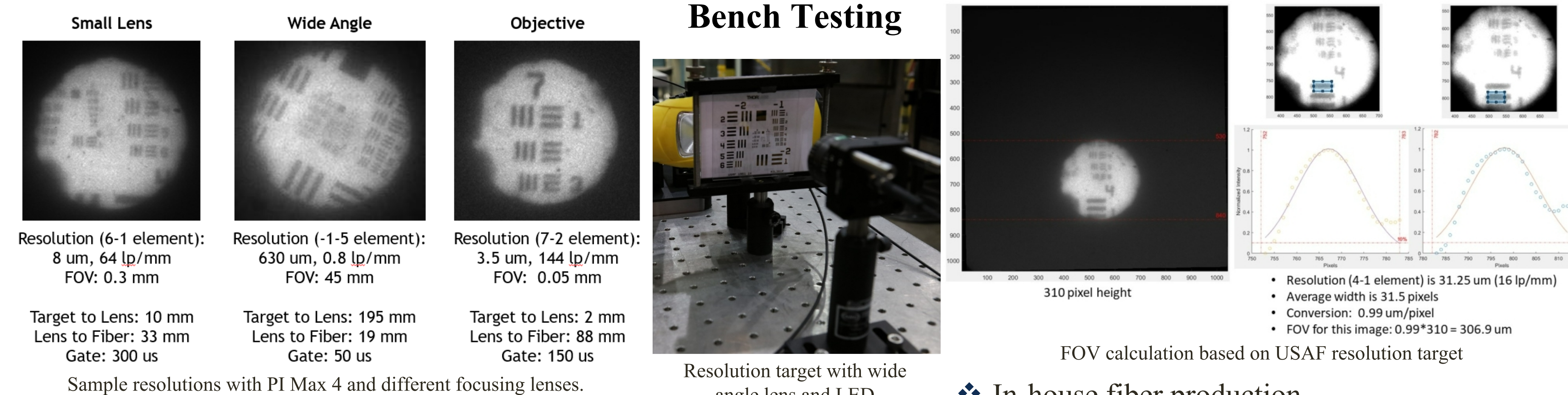


Sensor Side

- Fast cameras
 - PI Max 4 1024f
 - Gate minimum: 1.28 ns
 - ICCD, single frame
 - 13 um pixel size
 - 1 megapixel resolution
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Bench Testing



In-house fiber production

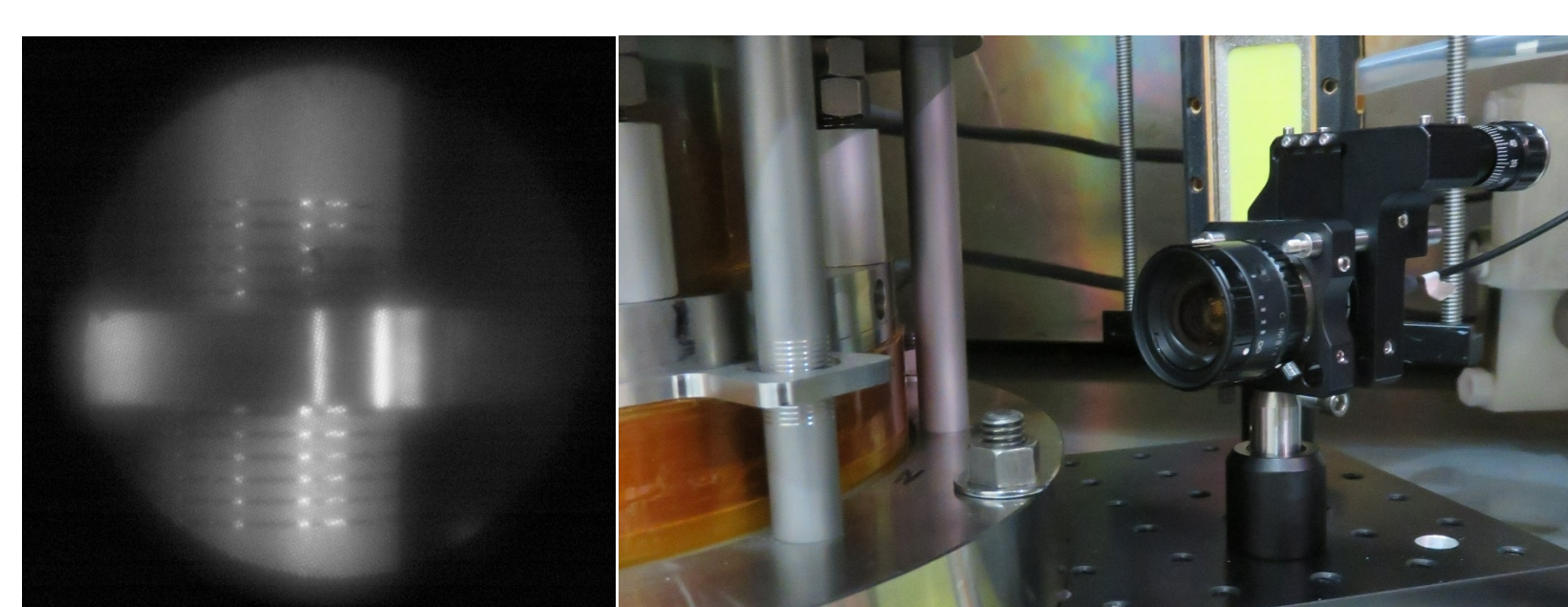
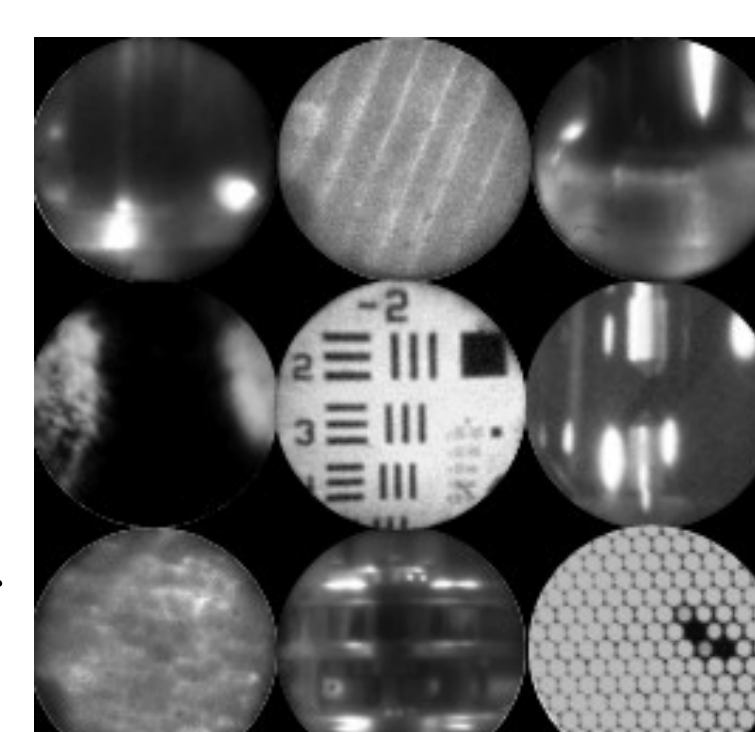
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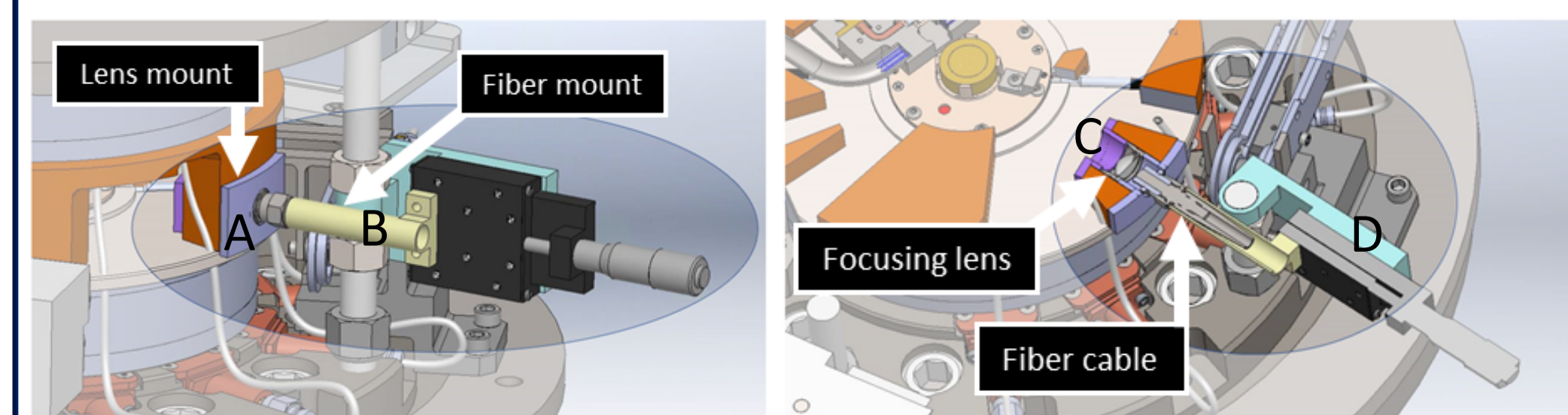
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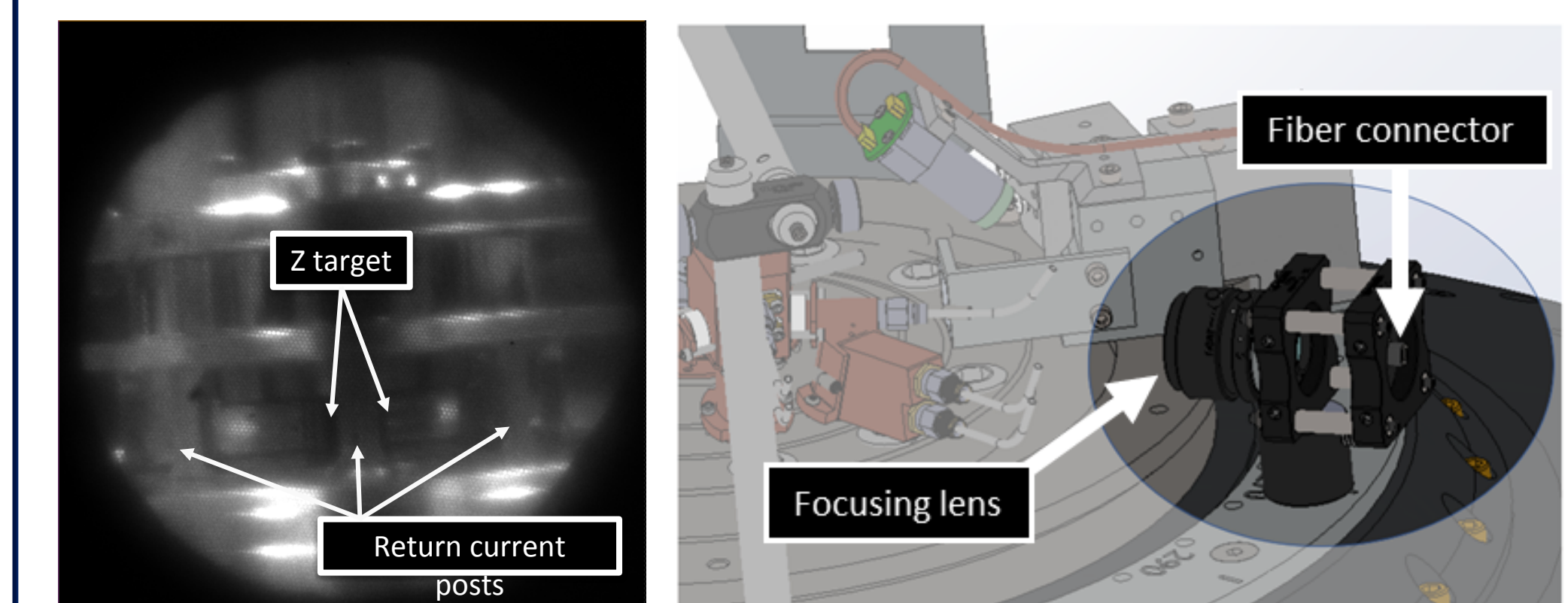
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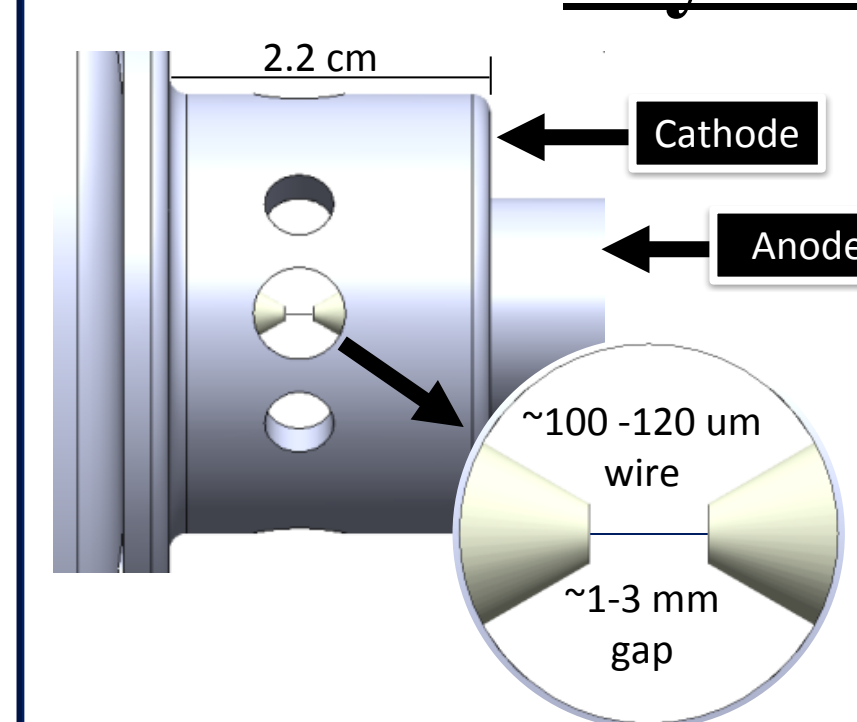


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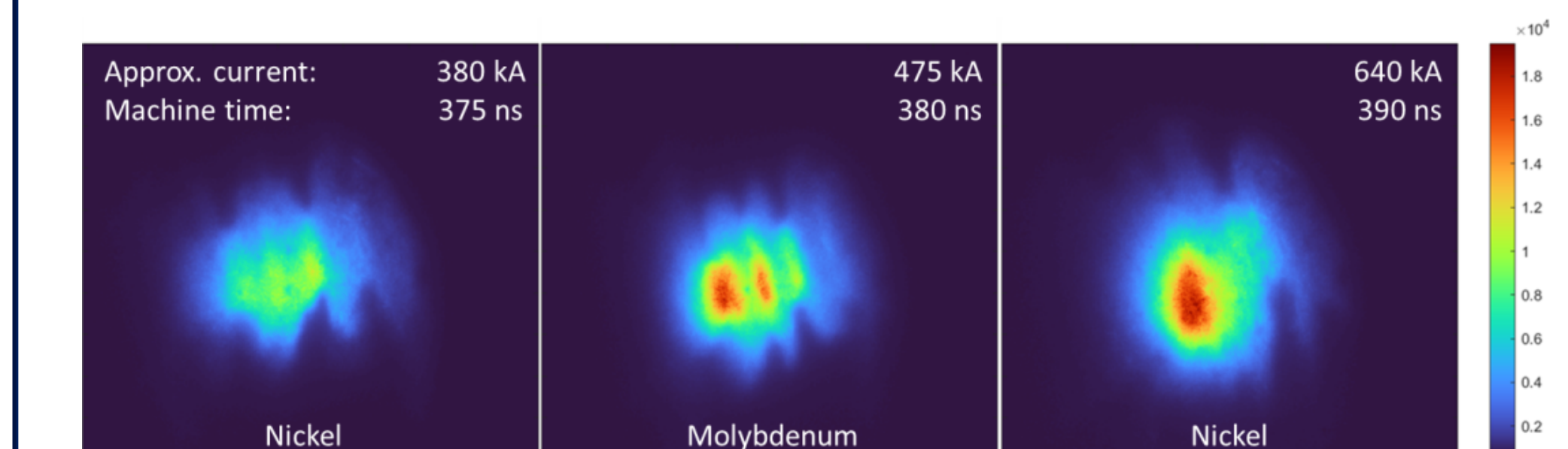
Mykonos Applications



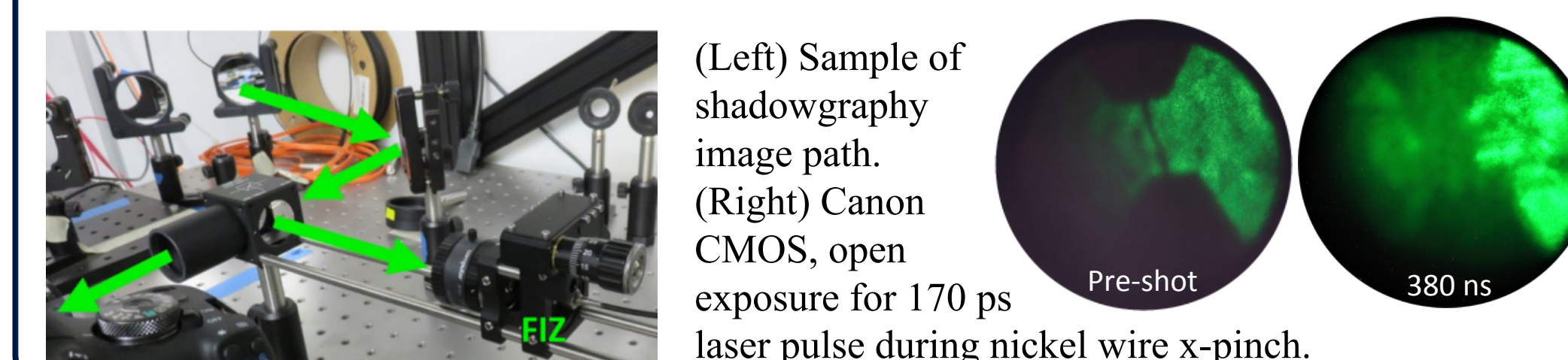
Hybrid x-pinch on Mykonos with self-emission and shadowgraphy. FIZ systems installed for each. Self-emission images taken with ICCD, 2 ns gate and 1x gain. The shadowgraphy laser (532 nm) has a pulse width of 170 ps.



Relation of wire to emission for nickel wire at 380 ns machine time.



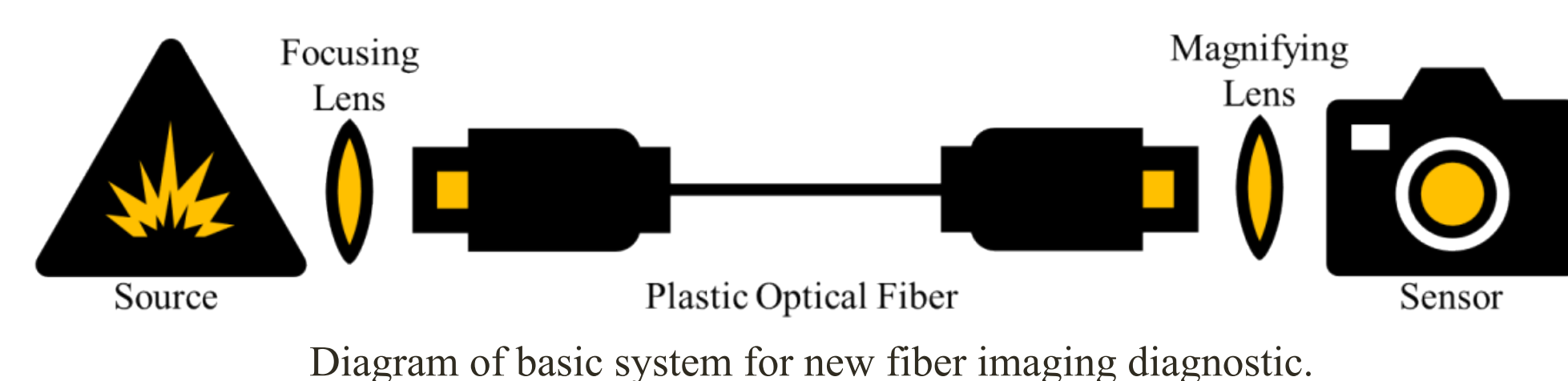
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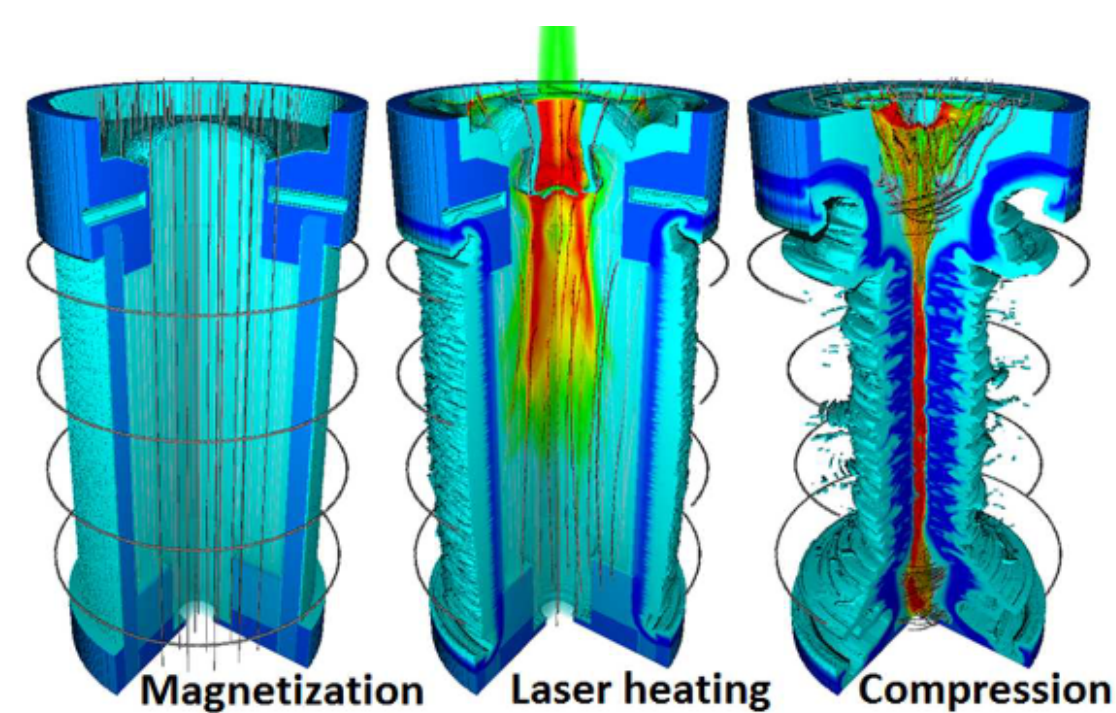
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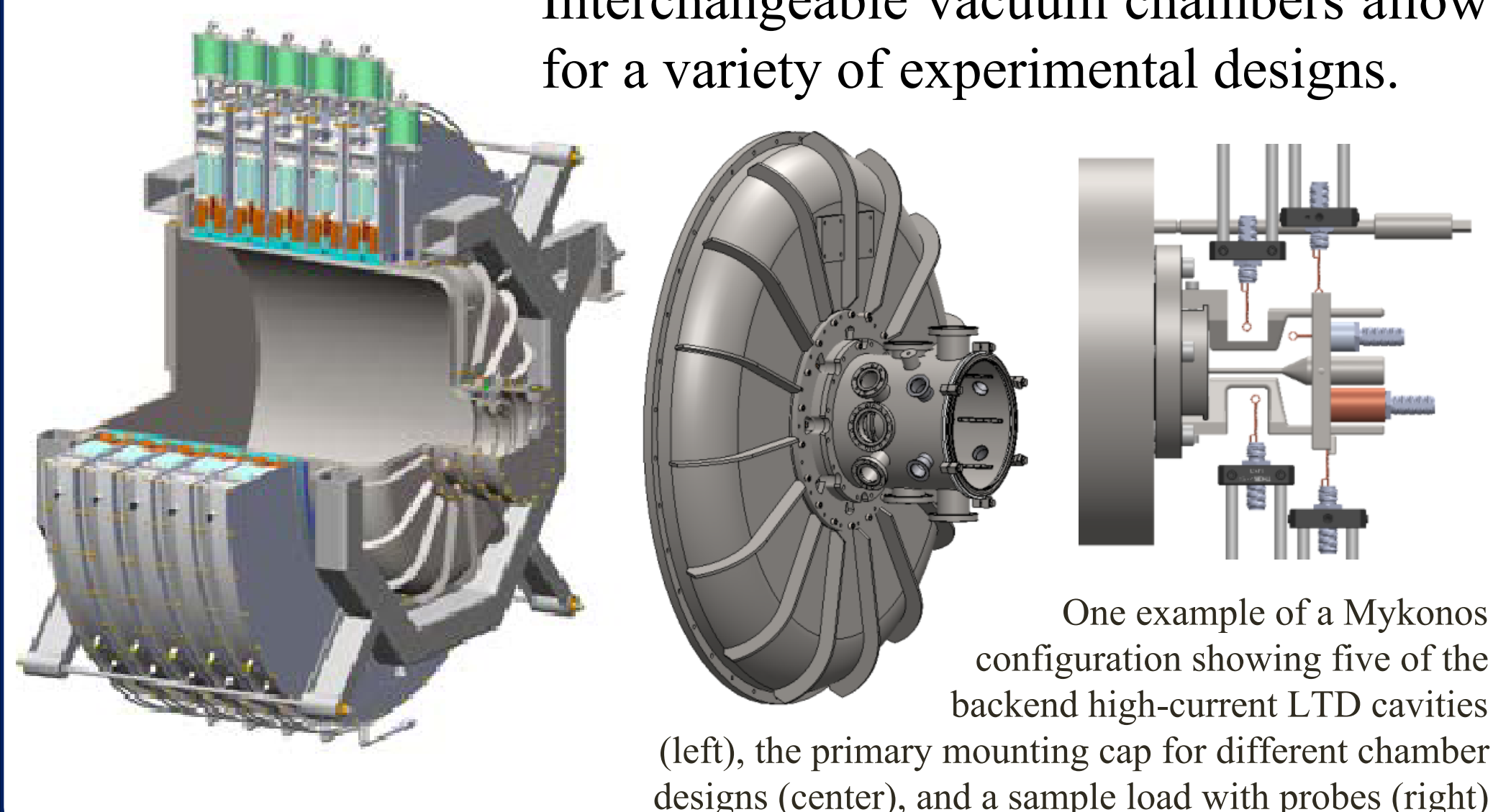
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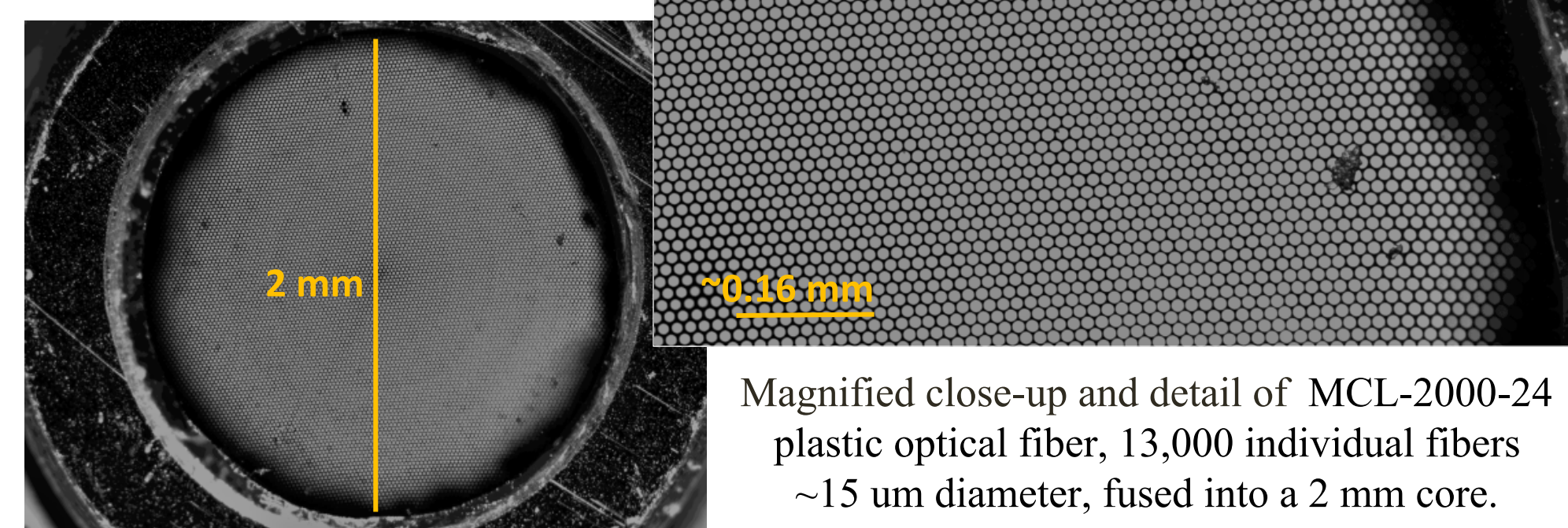
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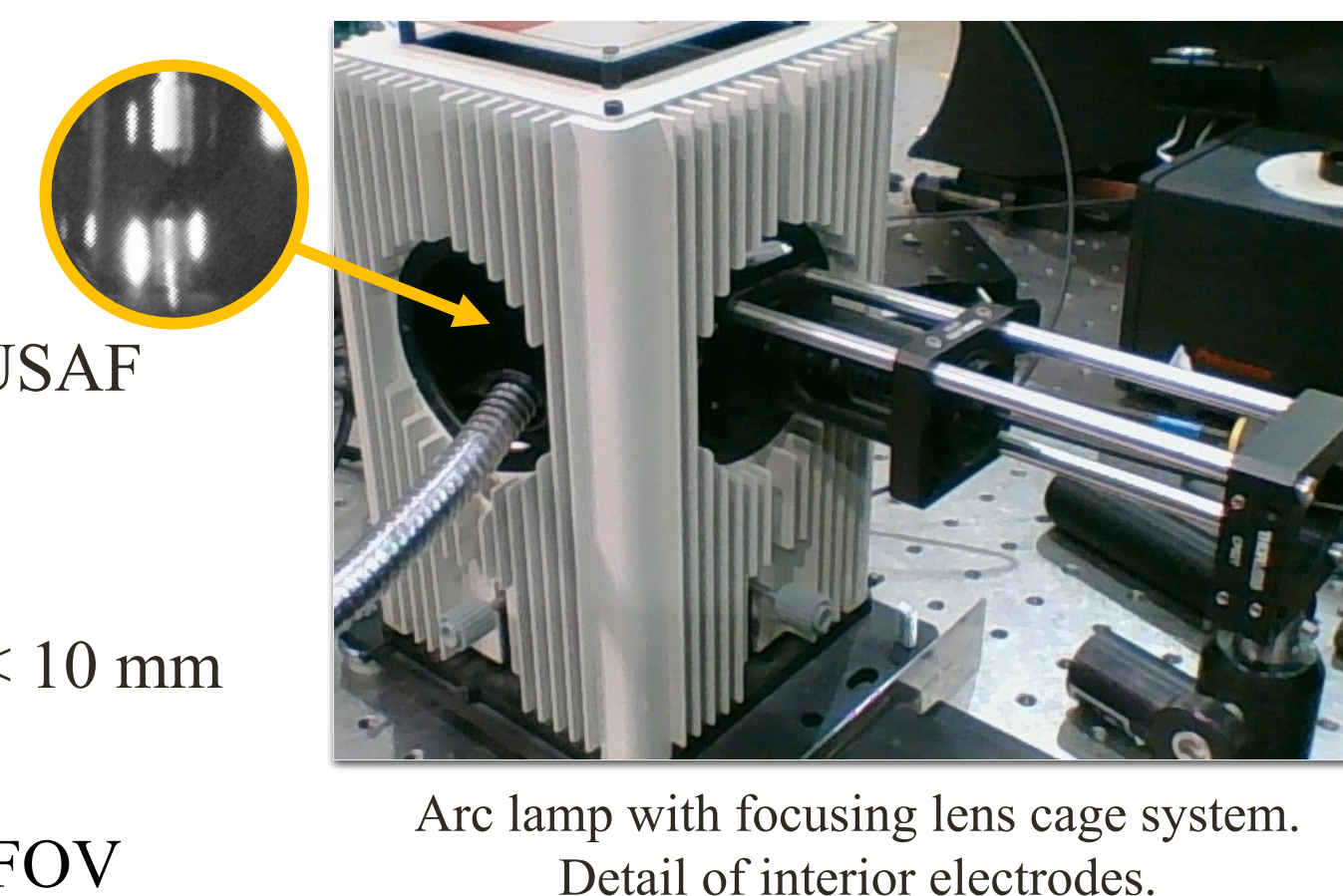
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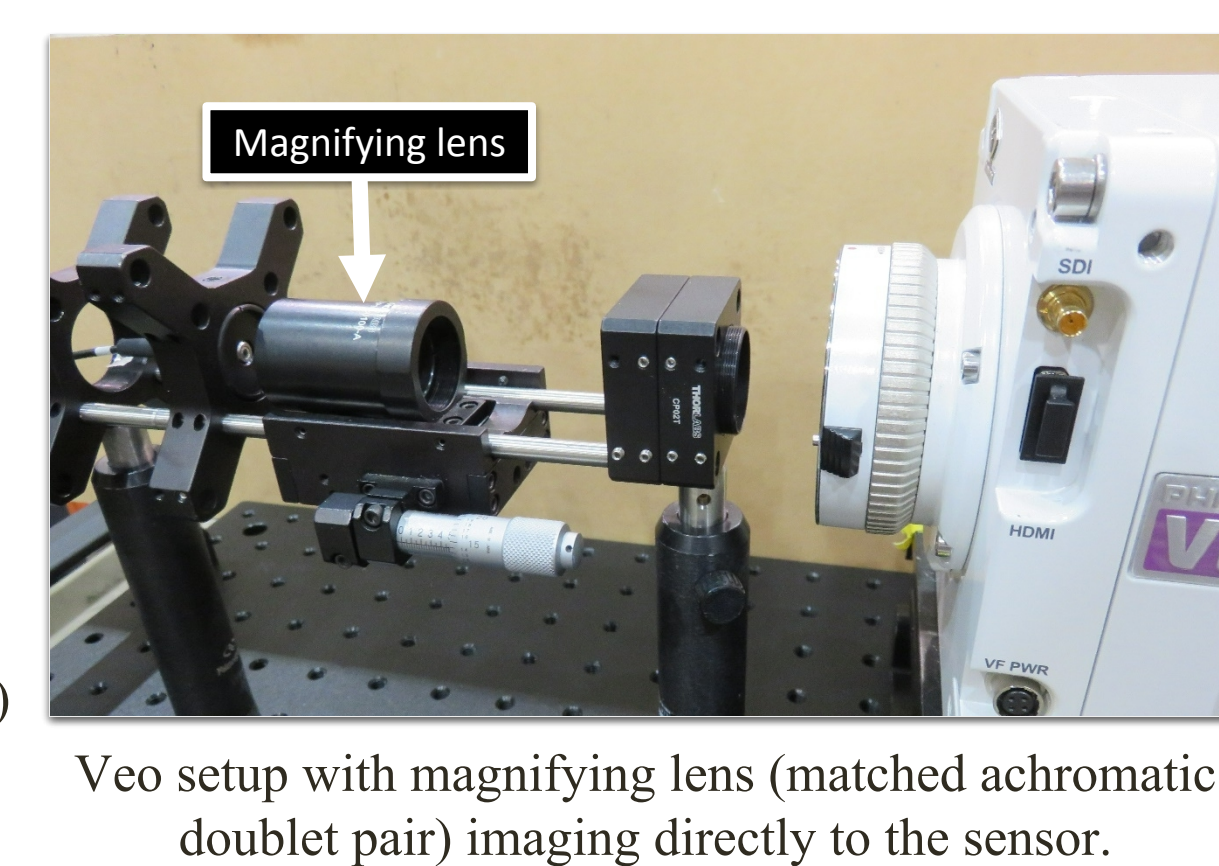
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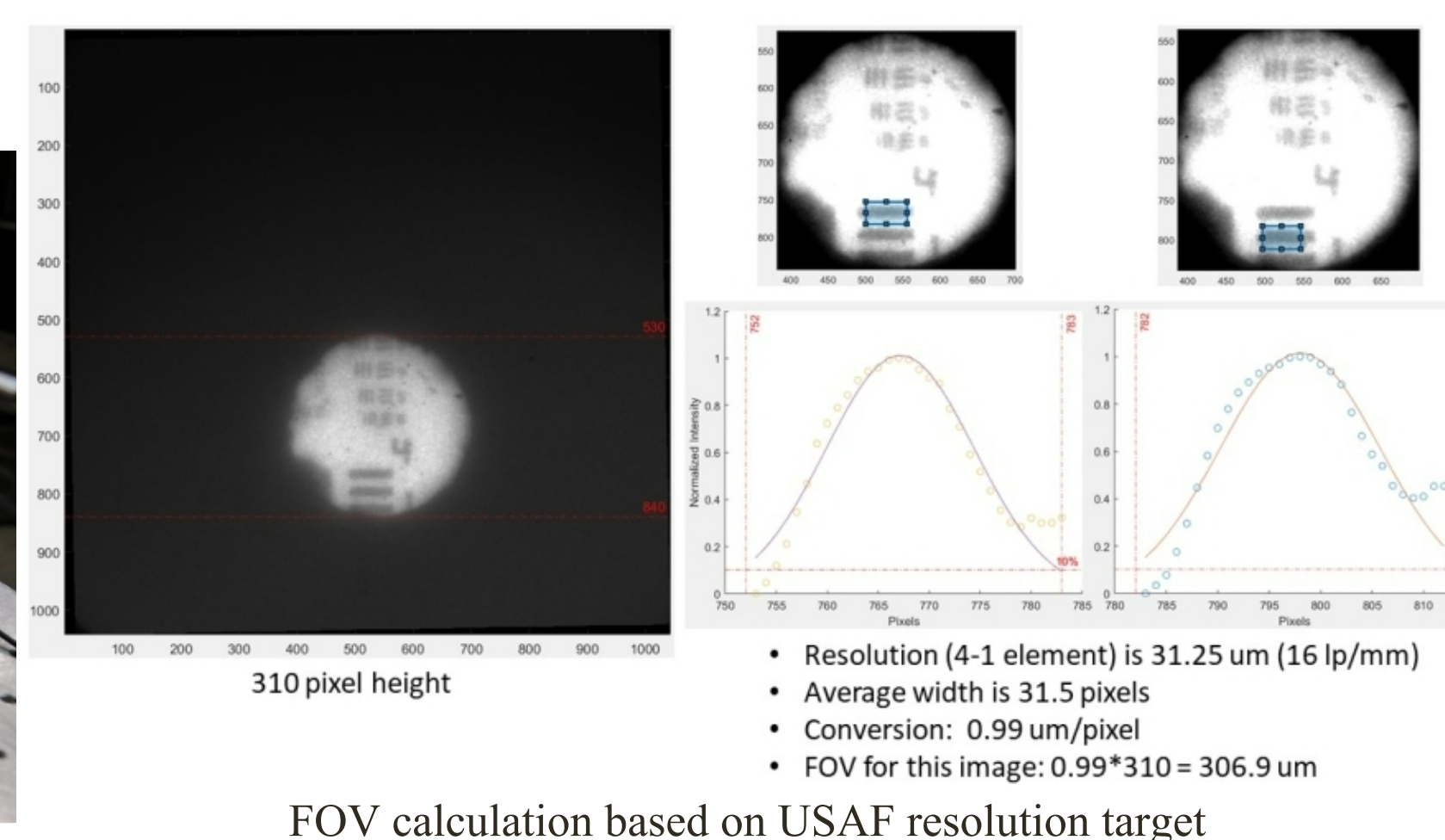
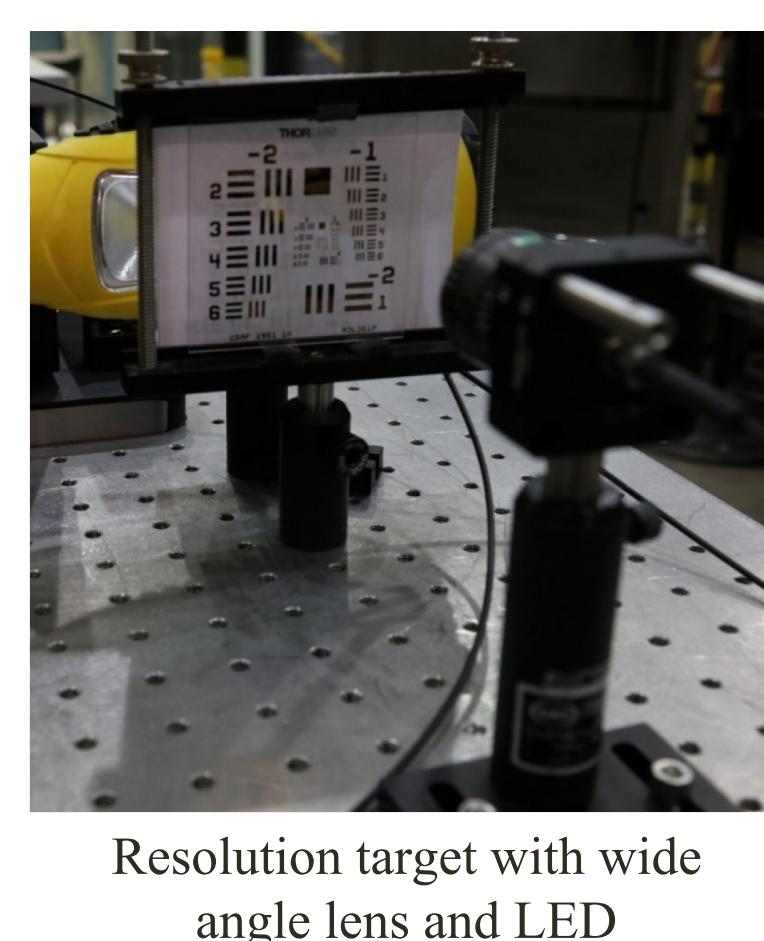
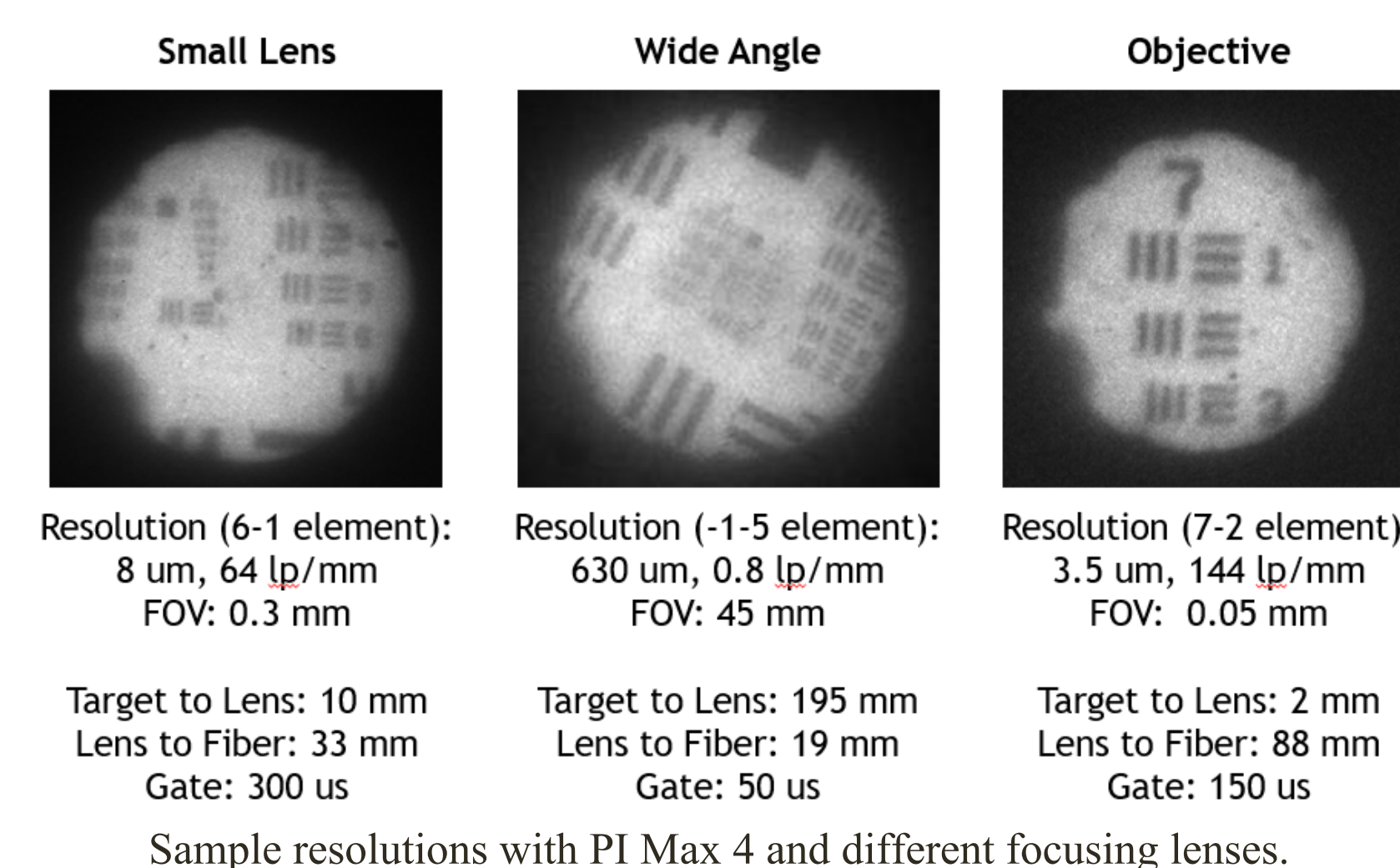


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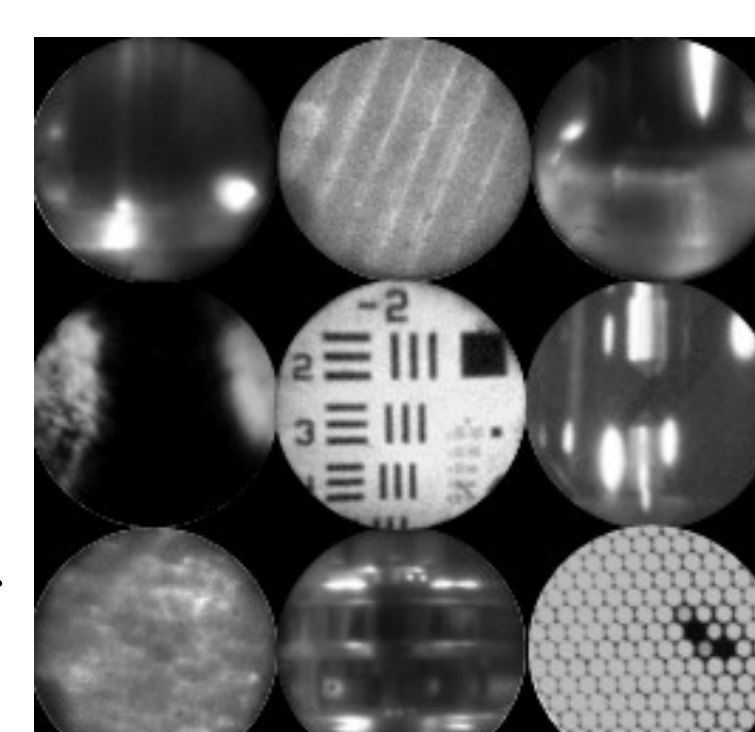


Bench Testing

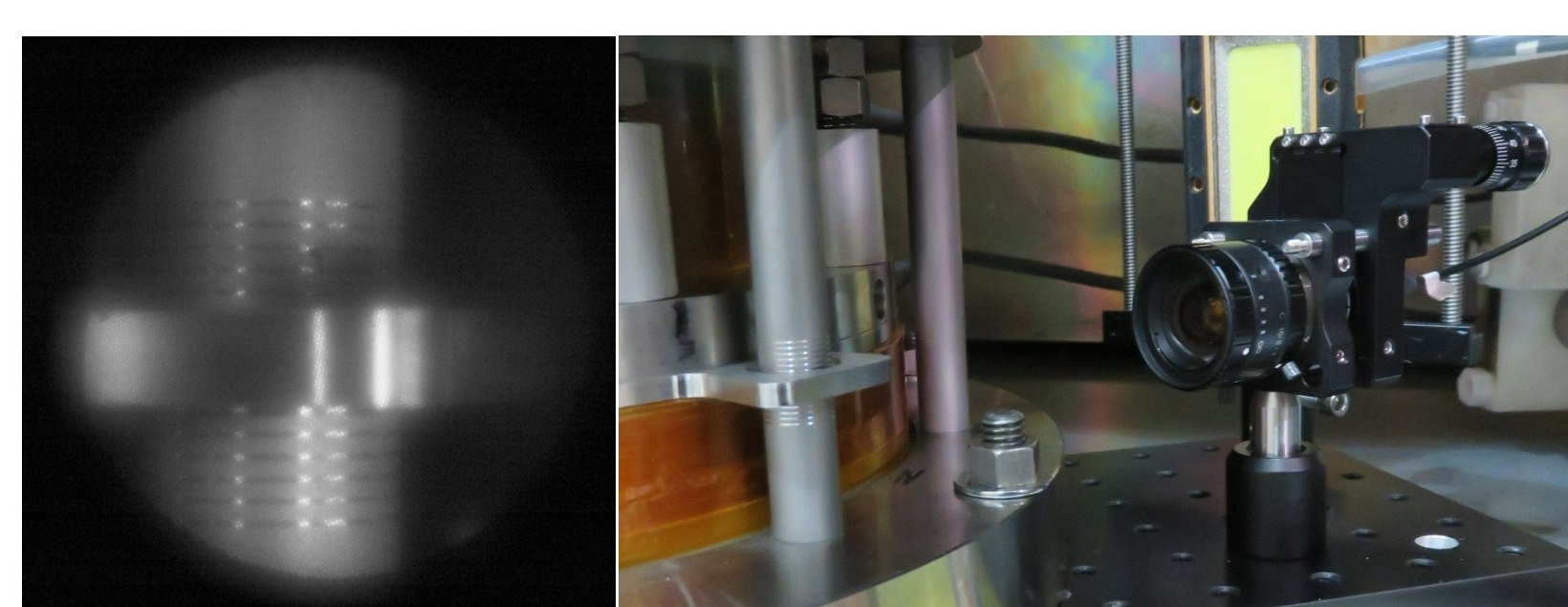


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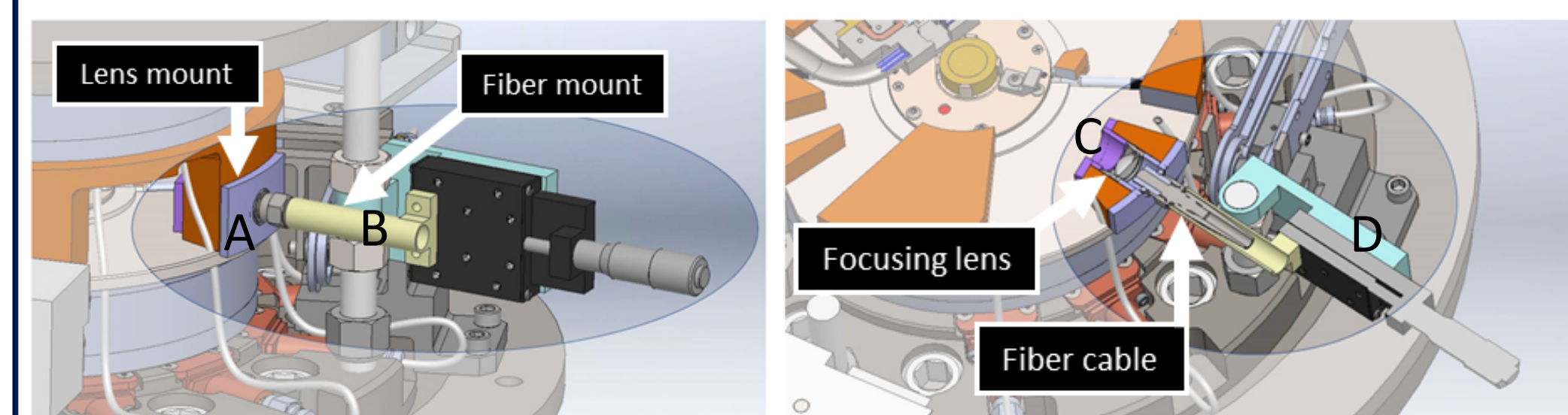
Troubleshooting MagLIF coils in vacuum



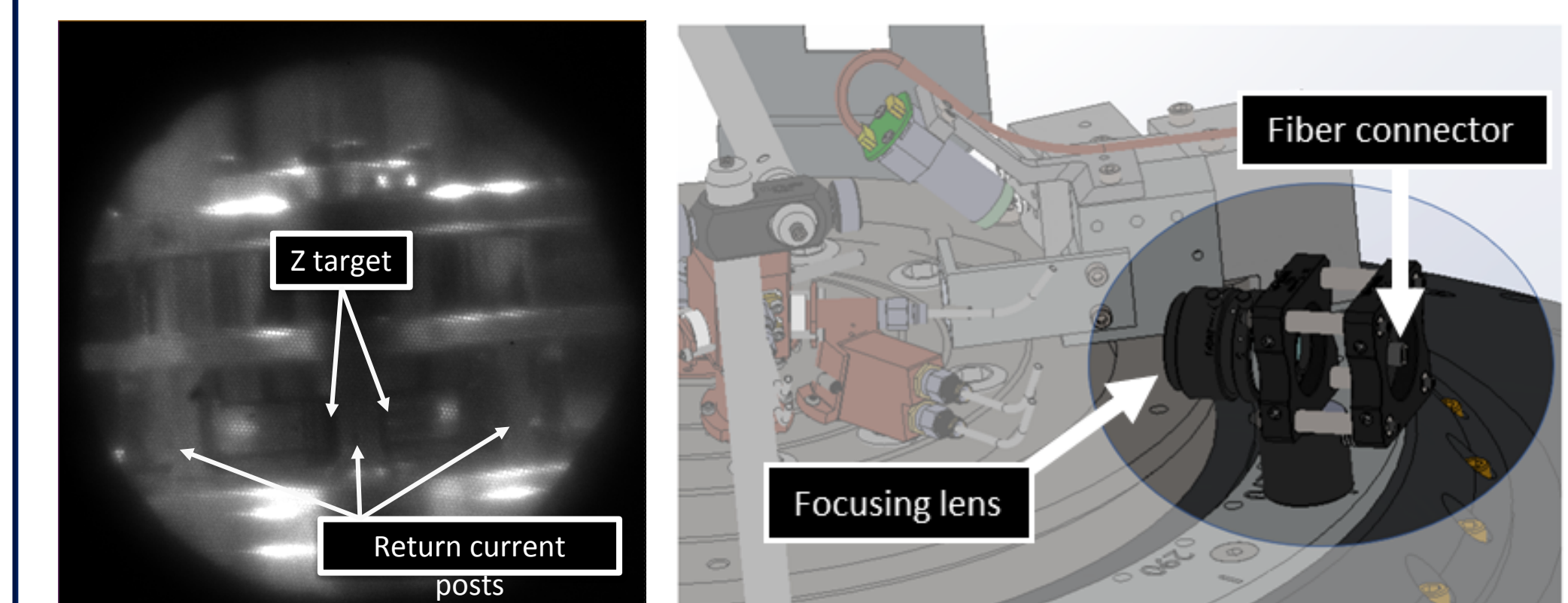
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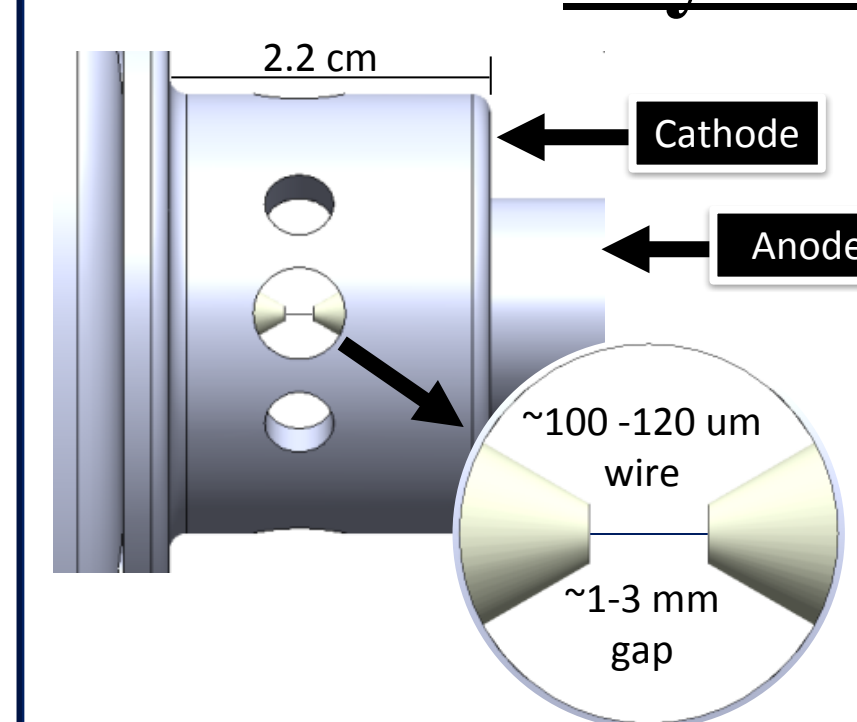


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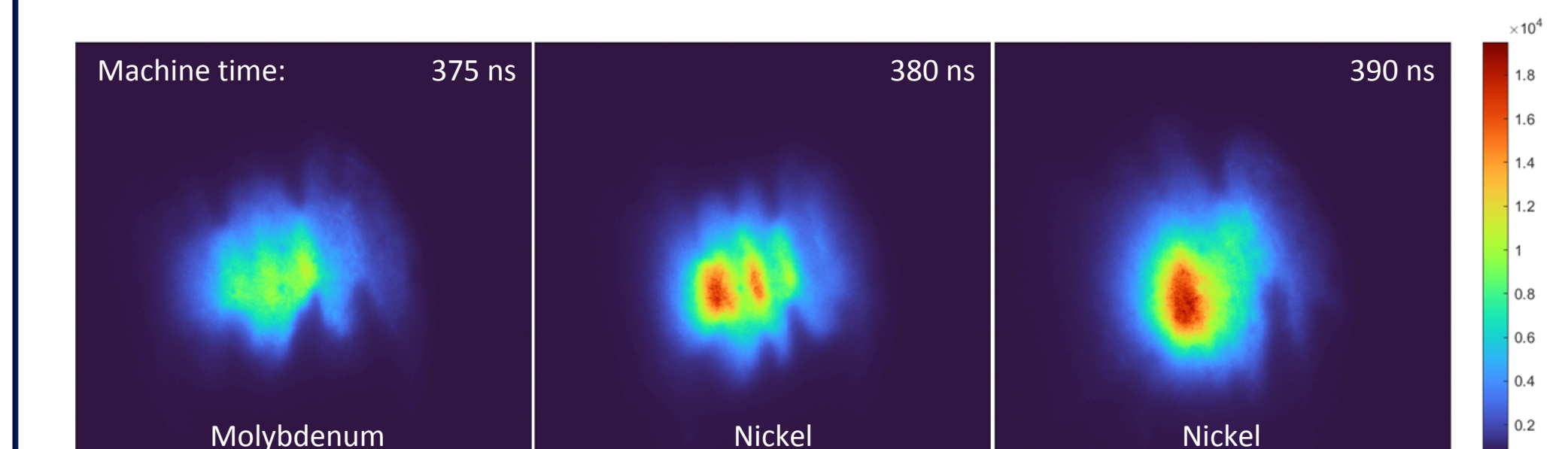
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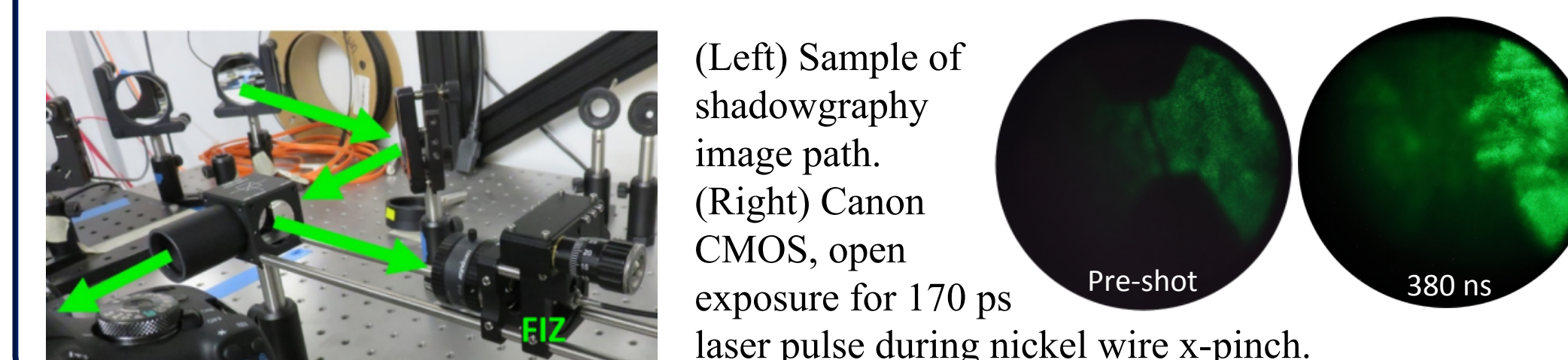
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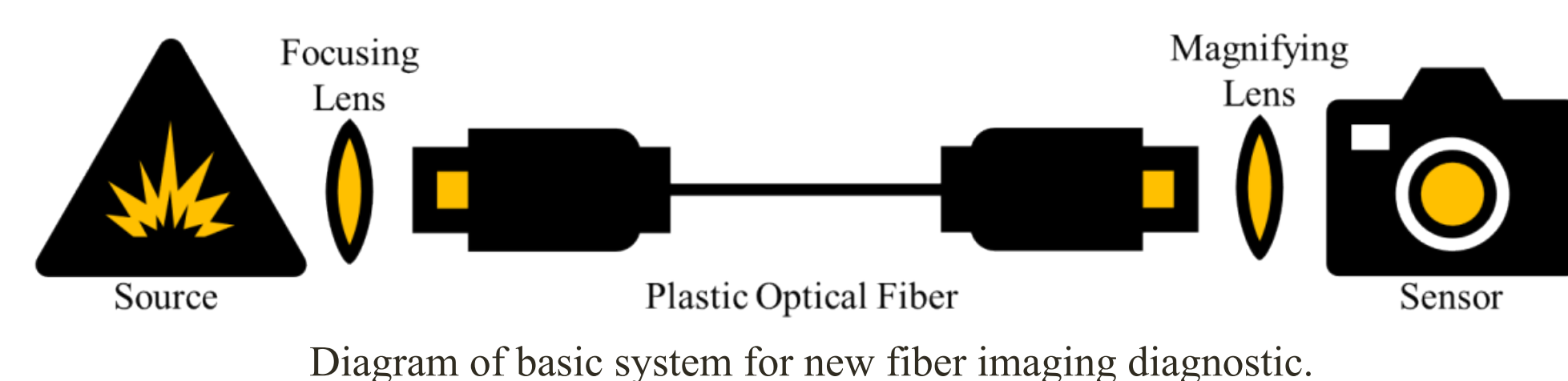
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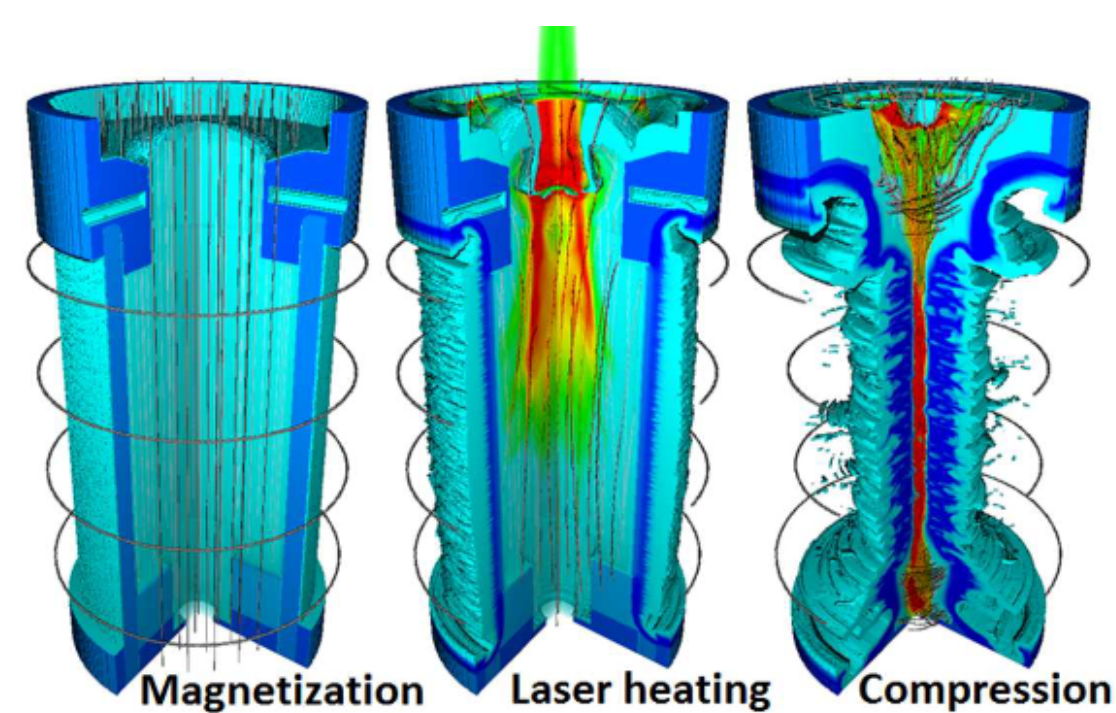
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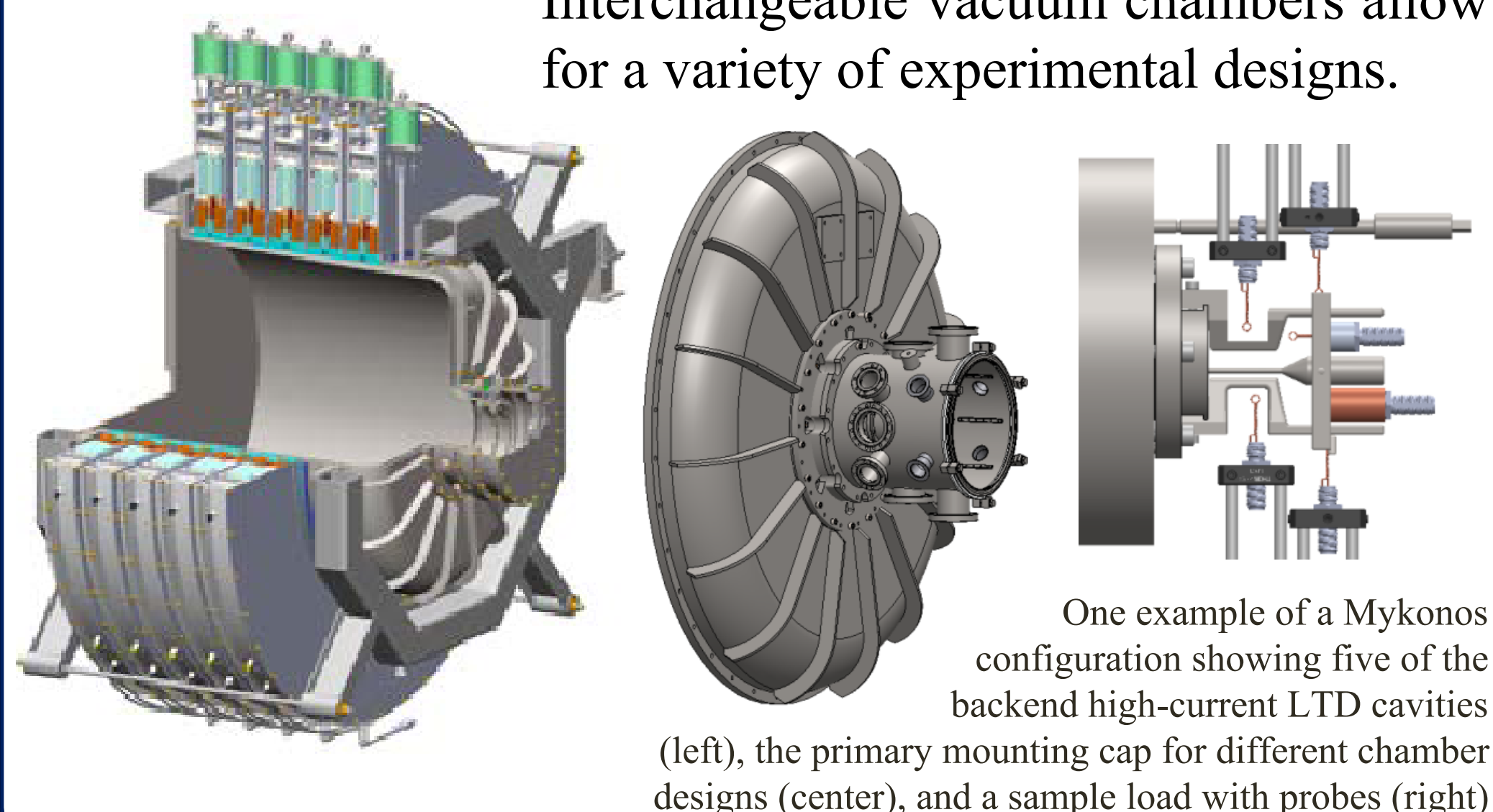
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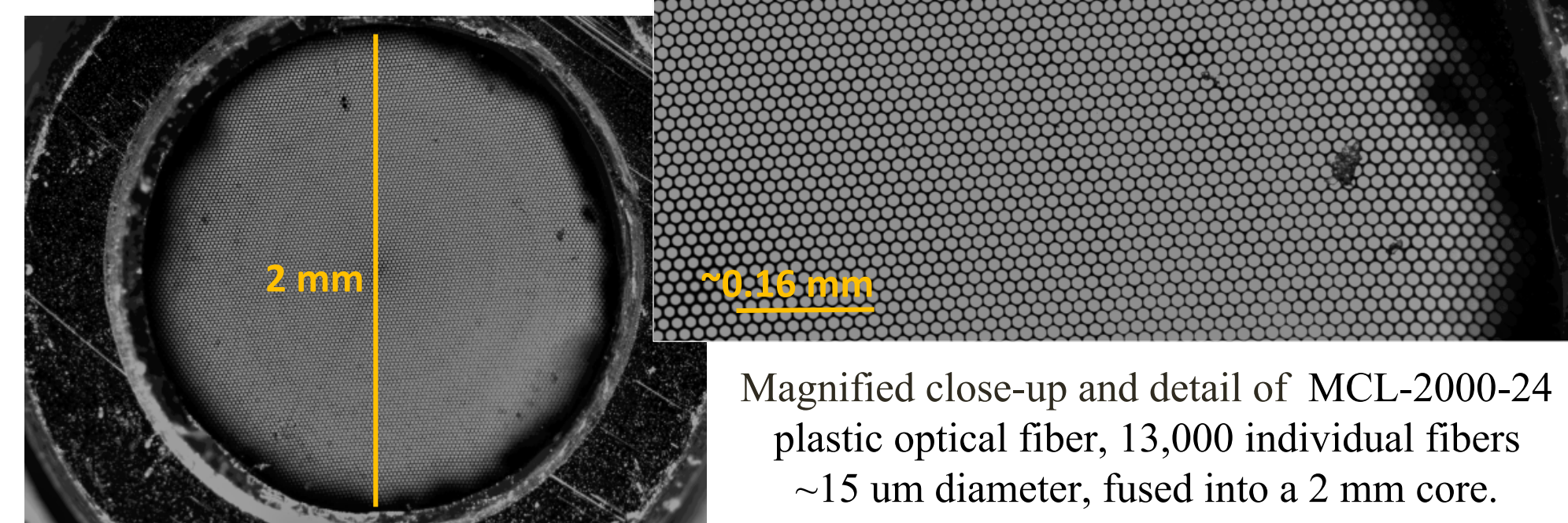
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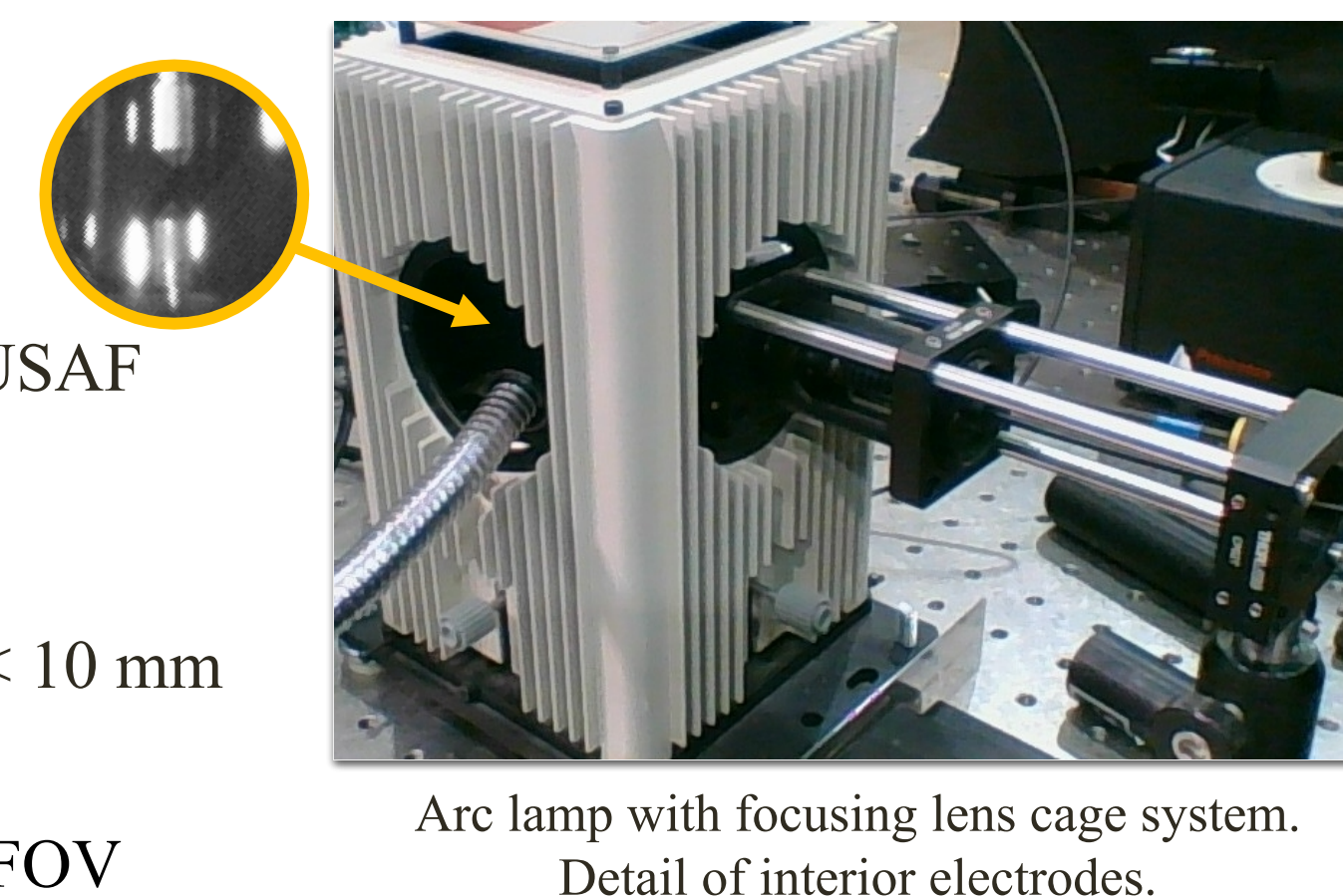
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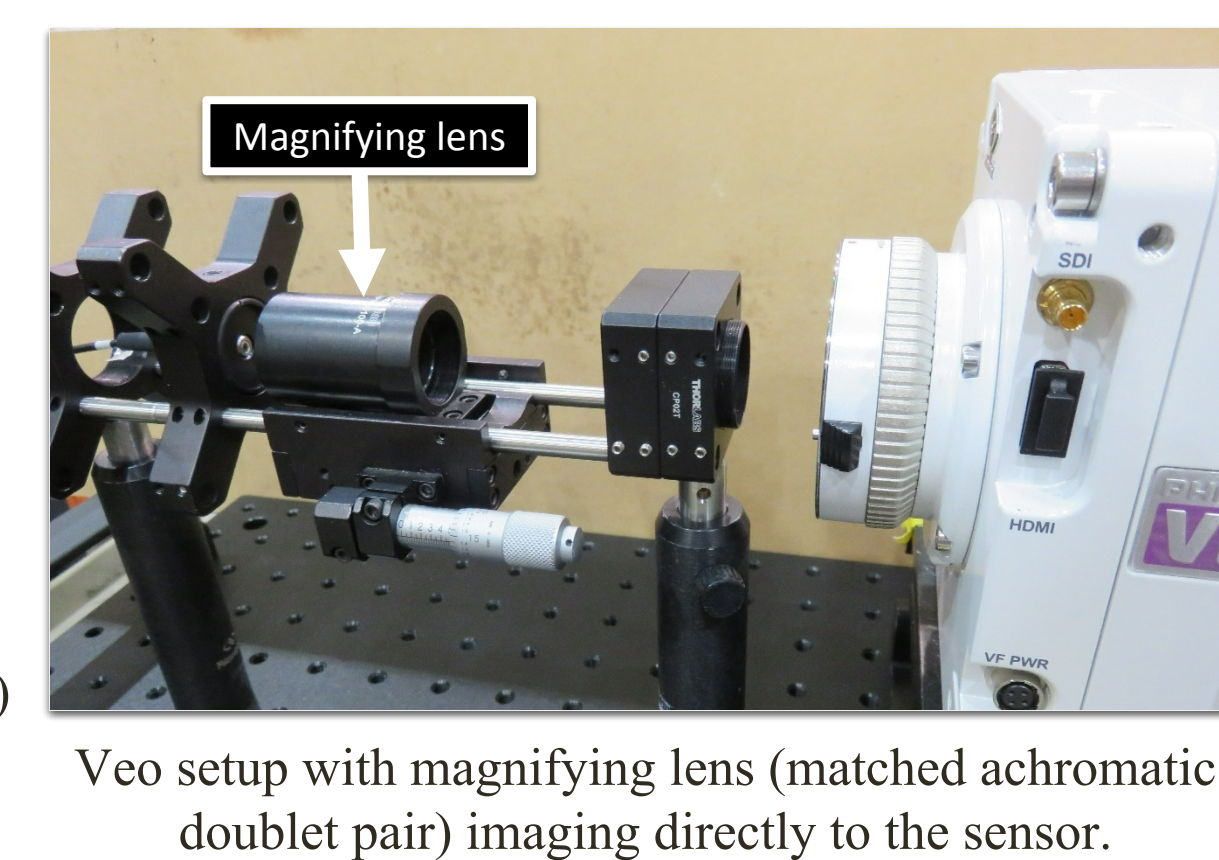
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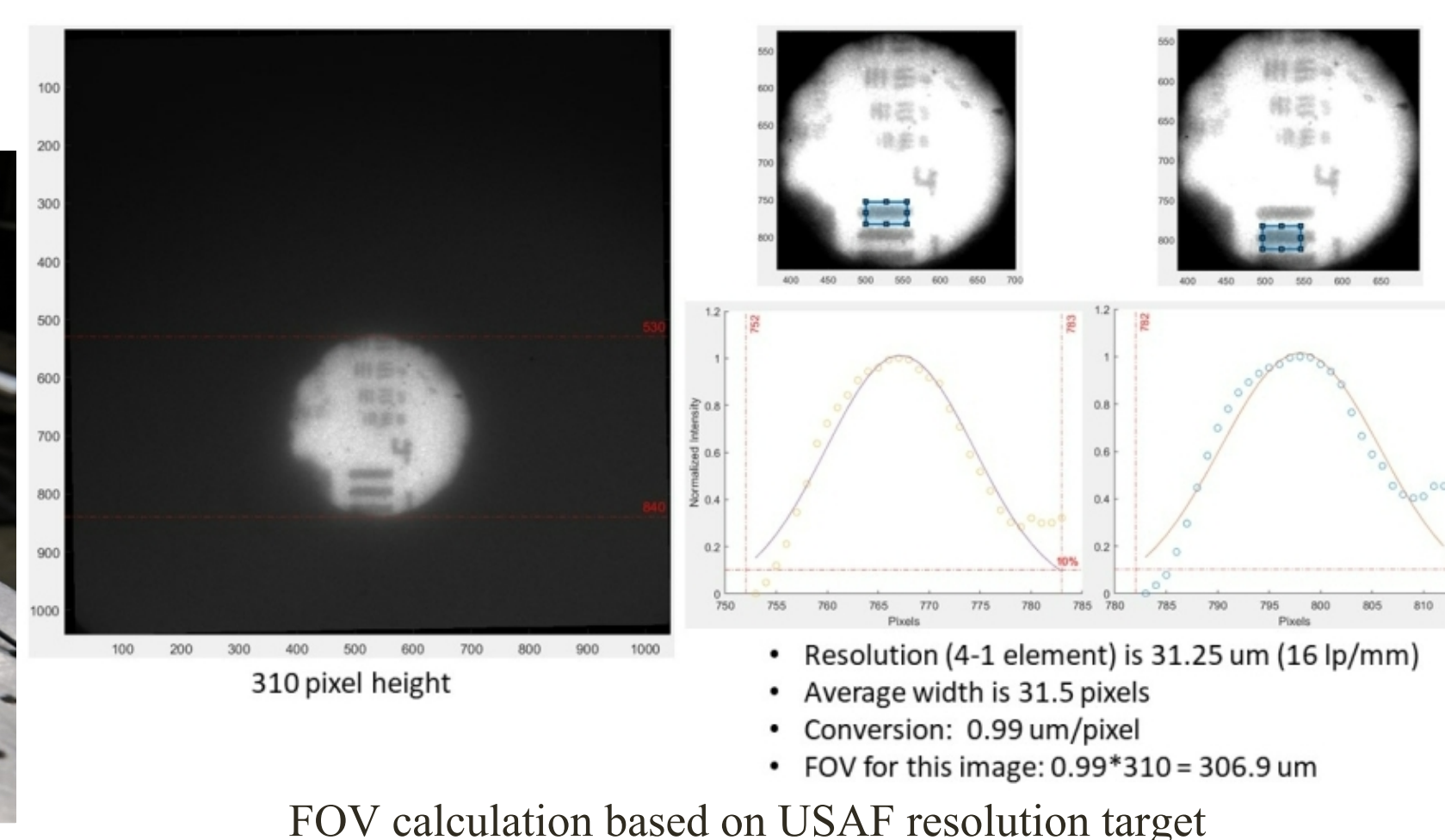
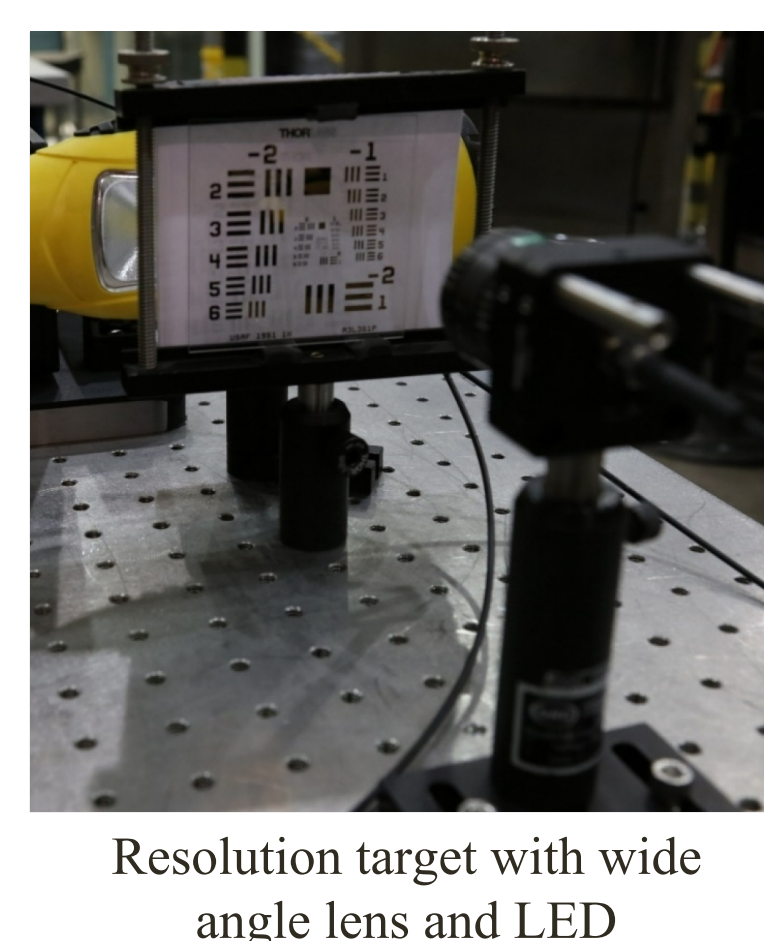
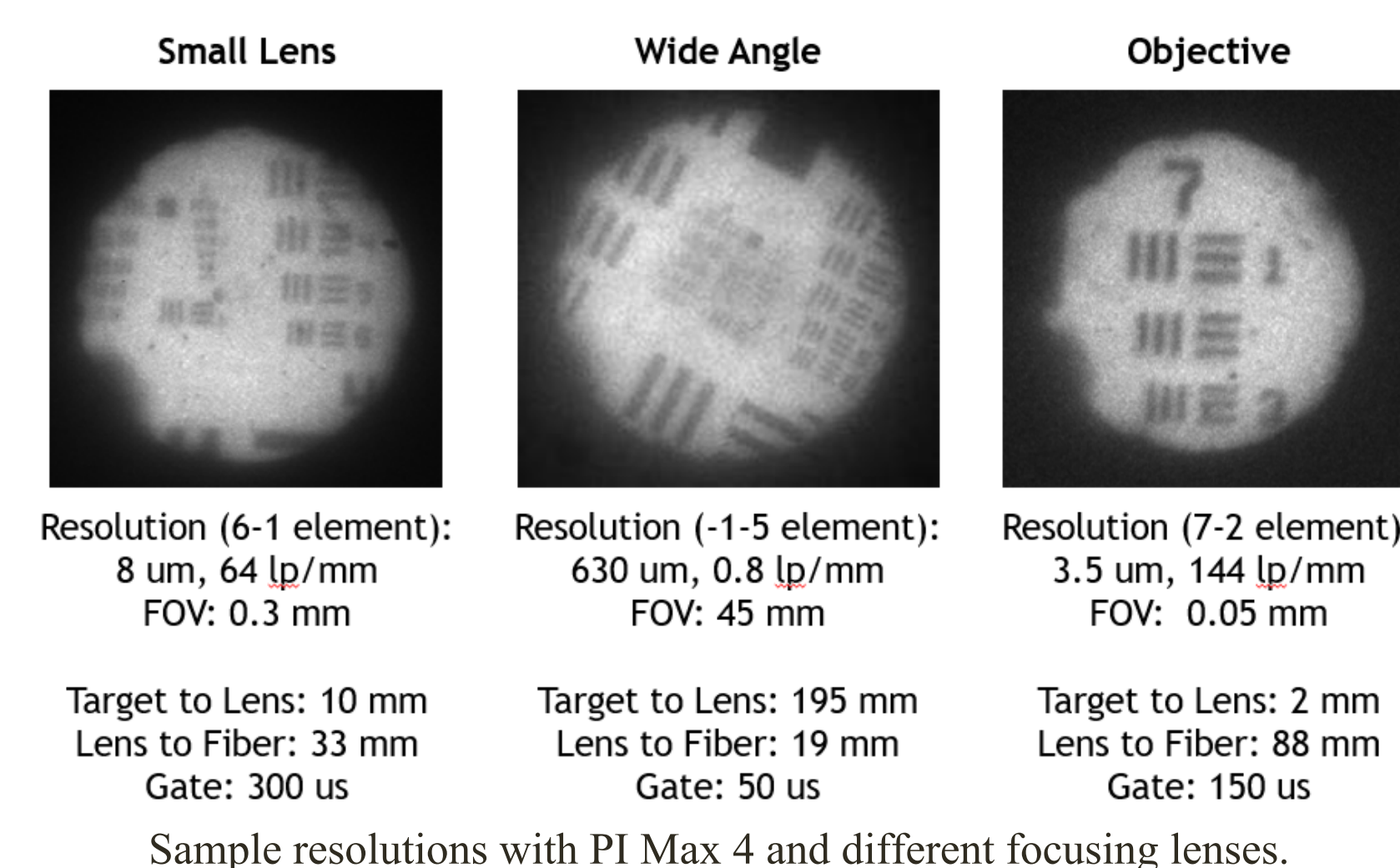


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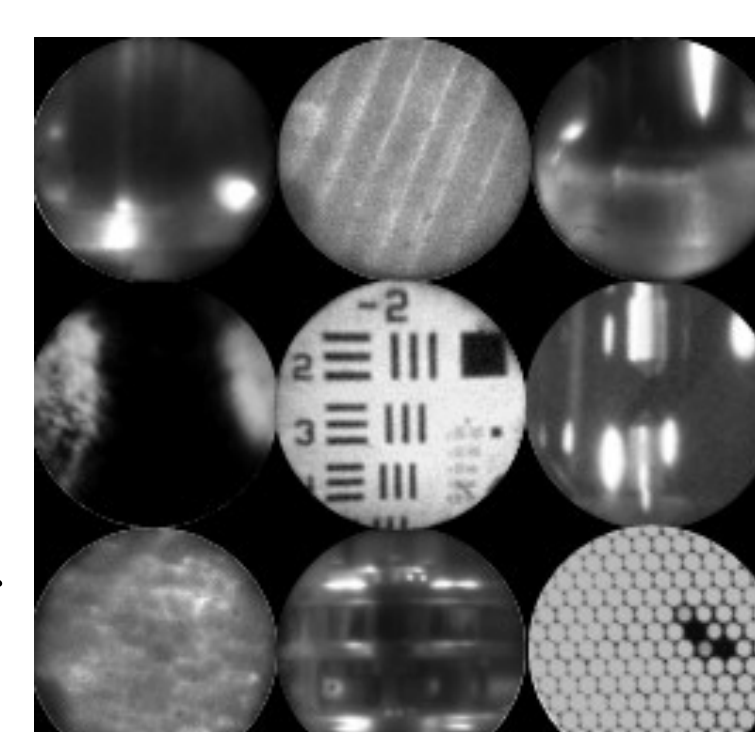


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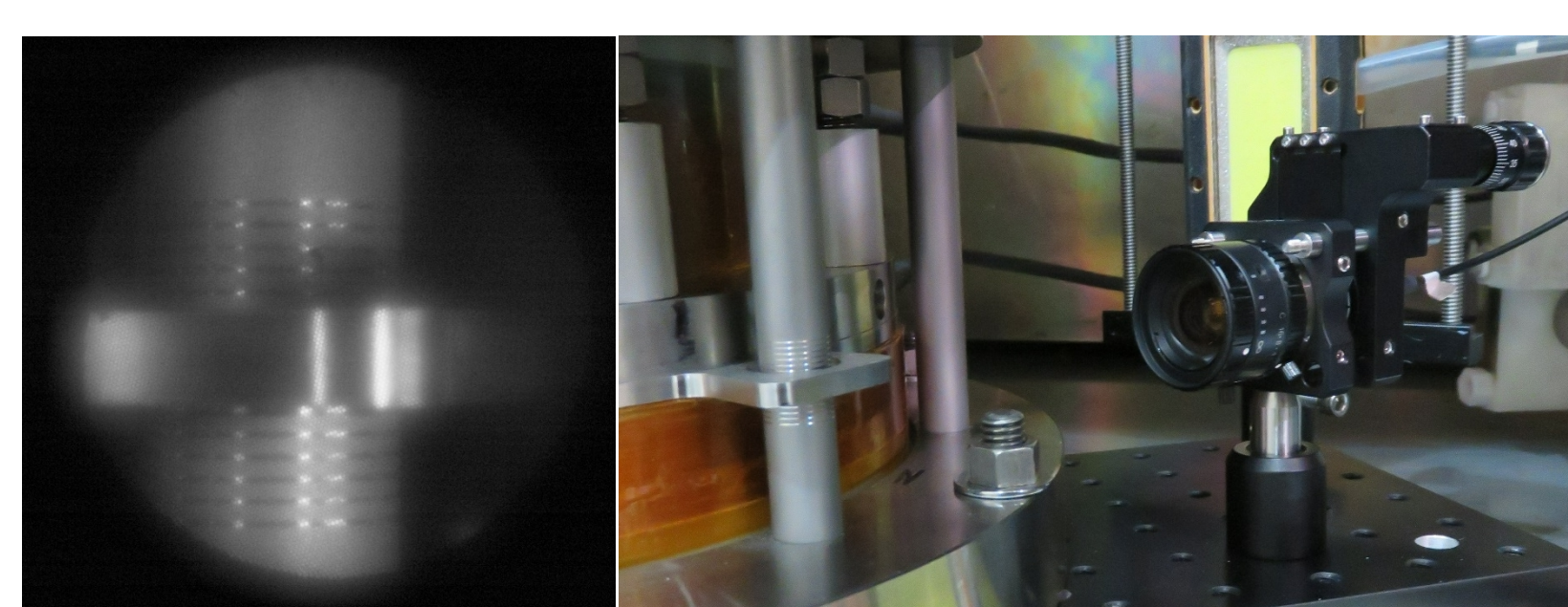


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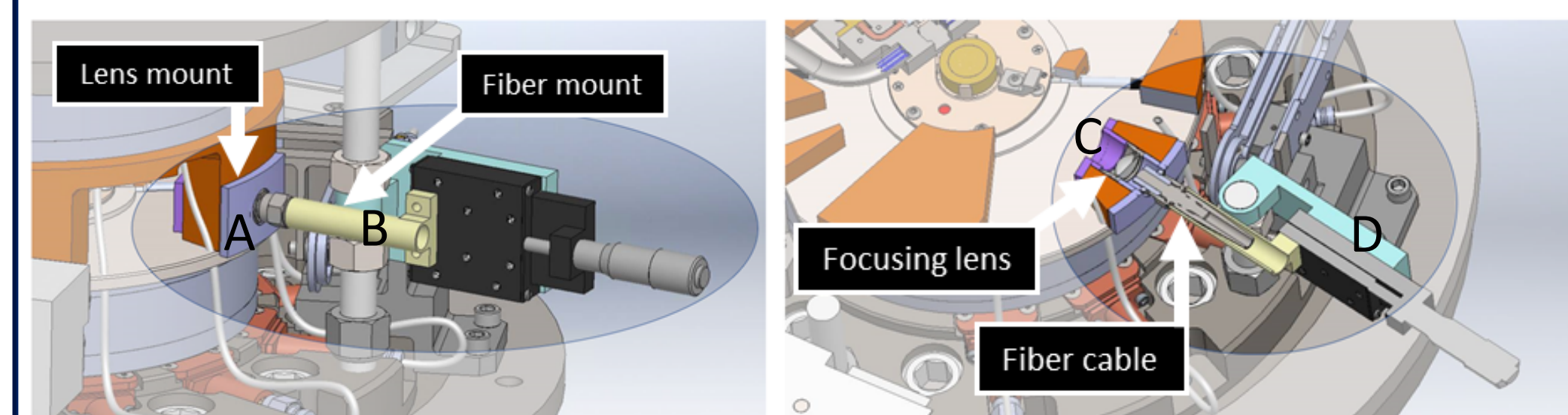
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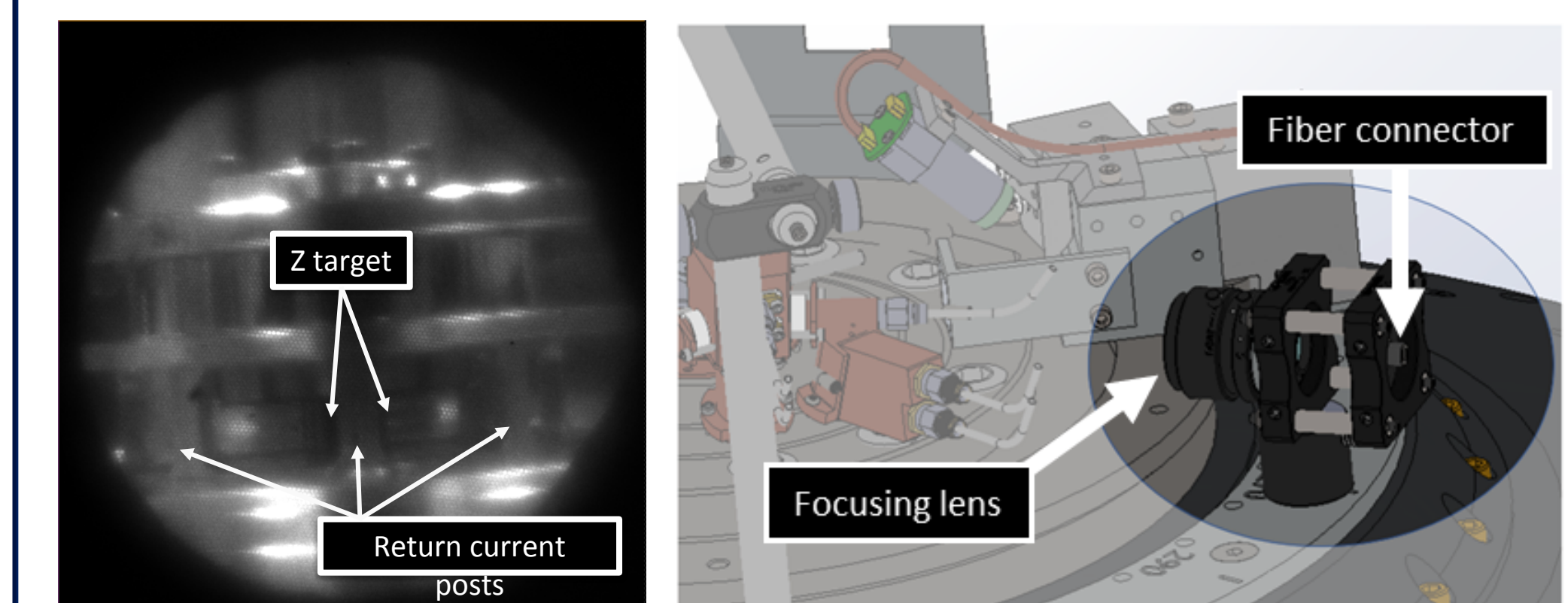
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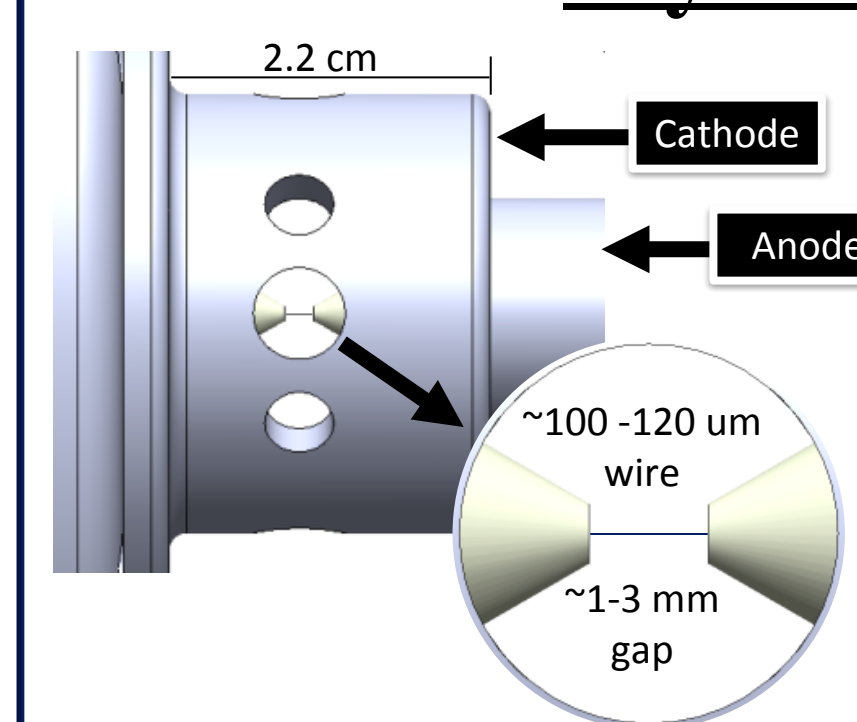


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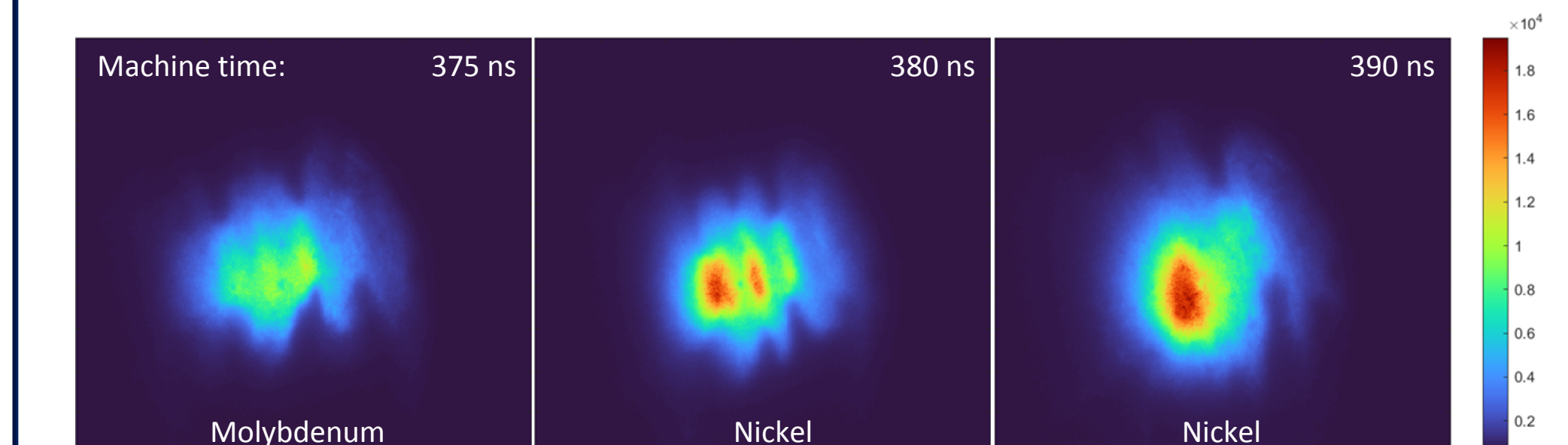
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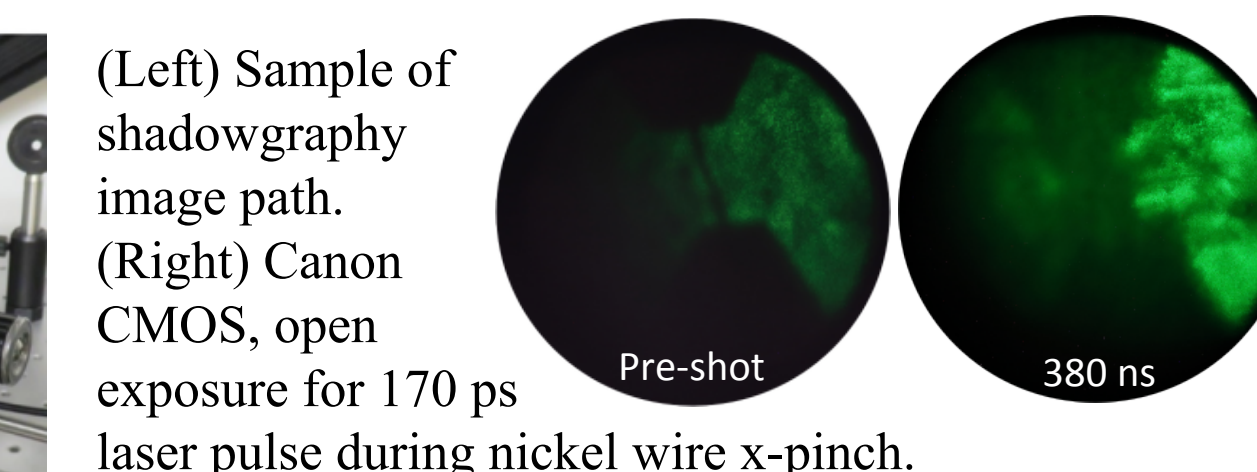
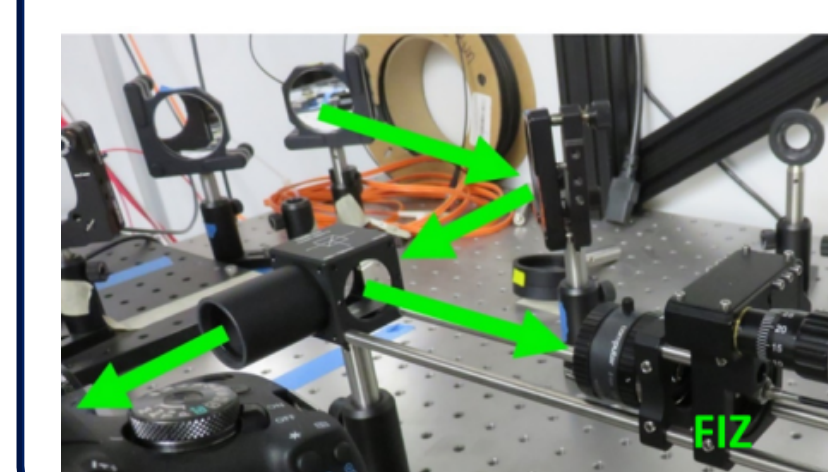
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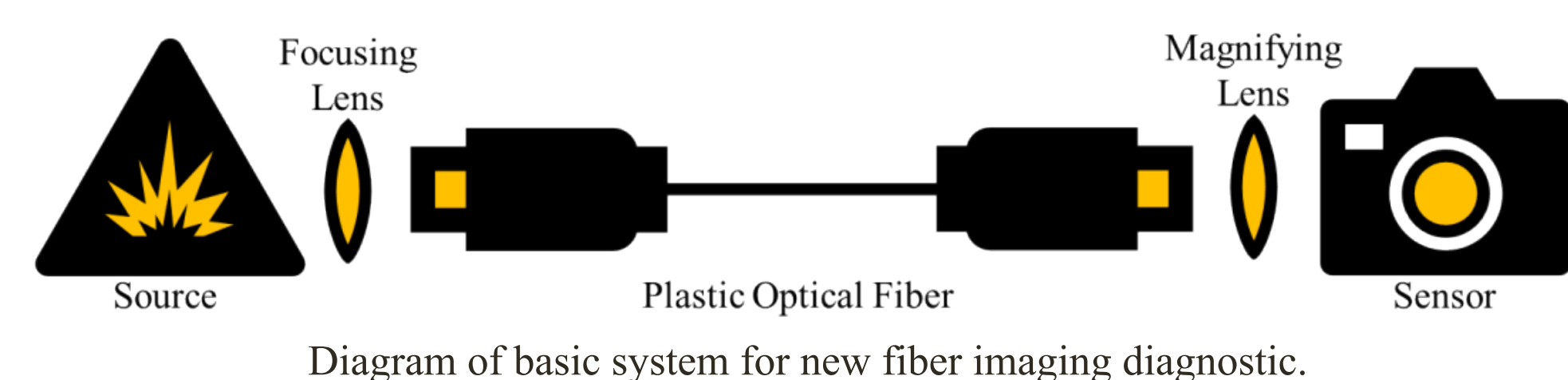
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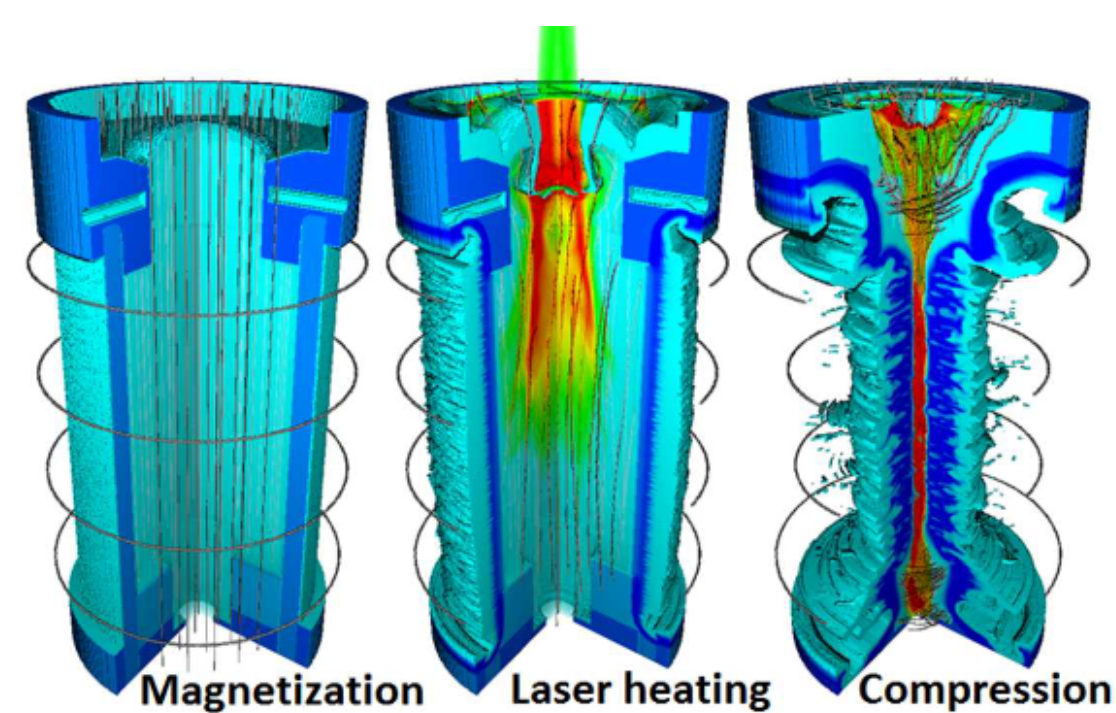
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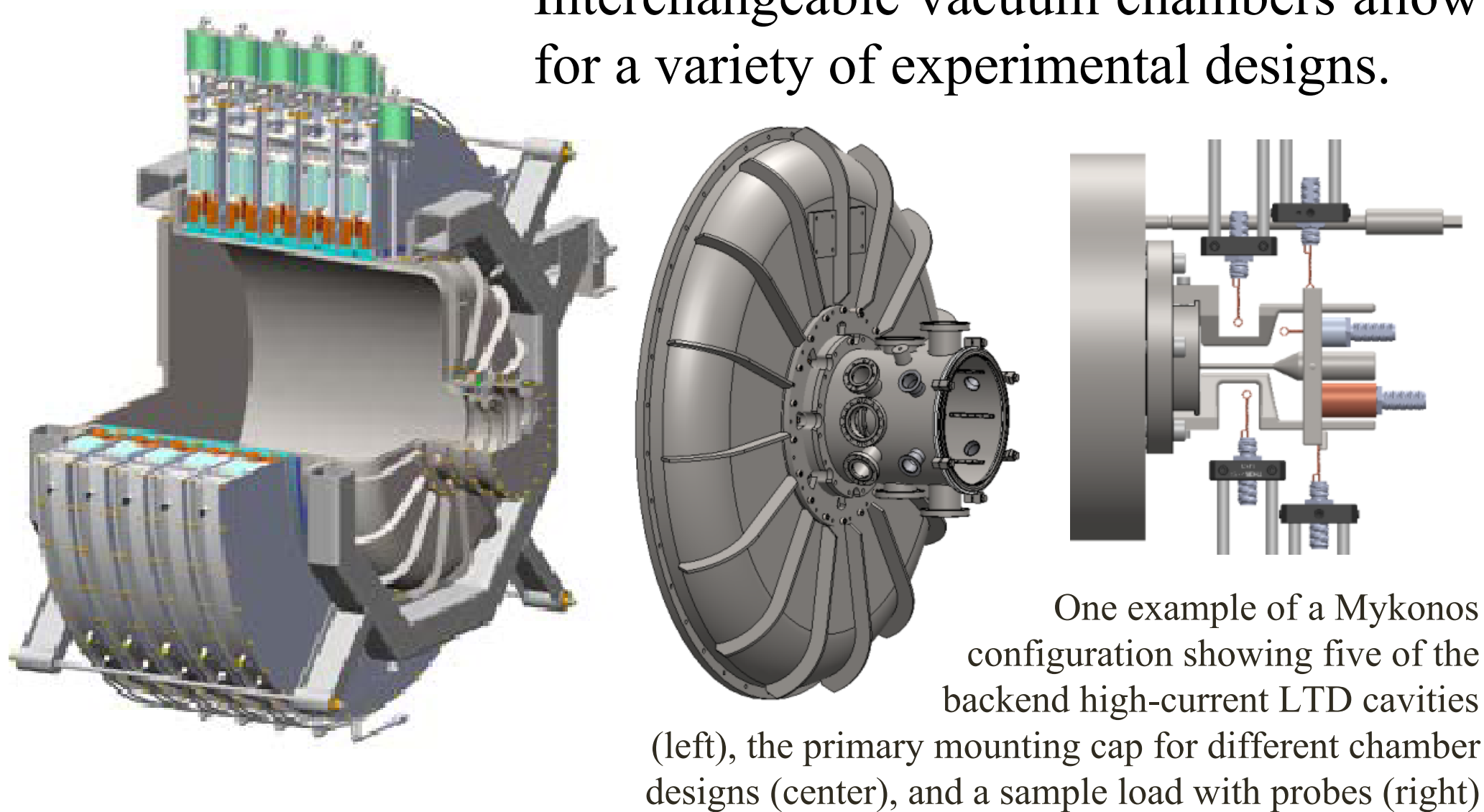
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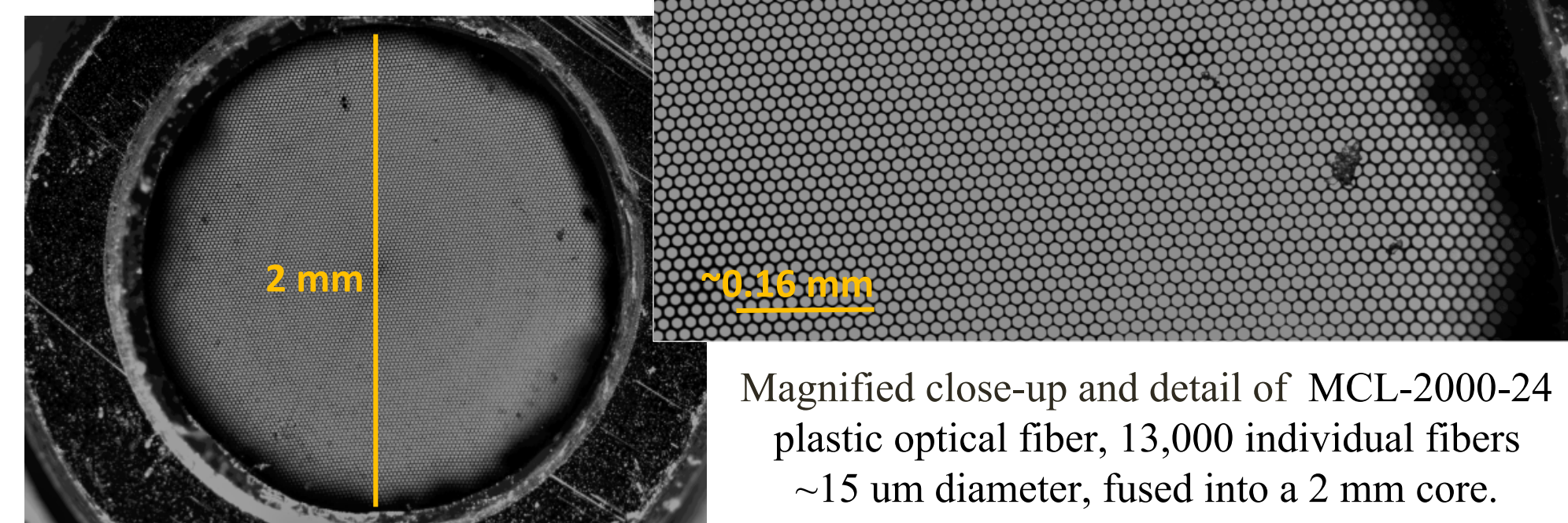
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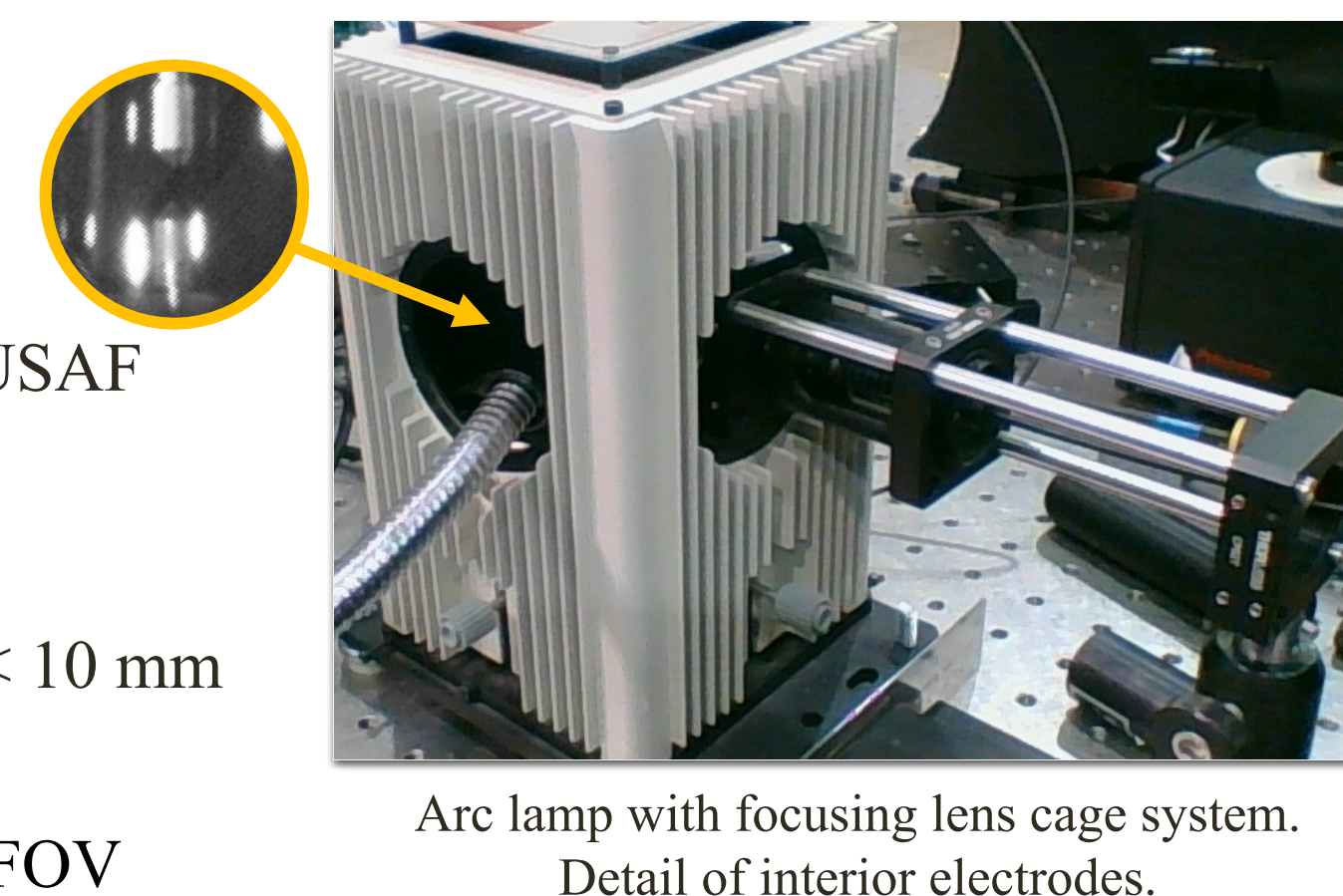
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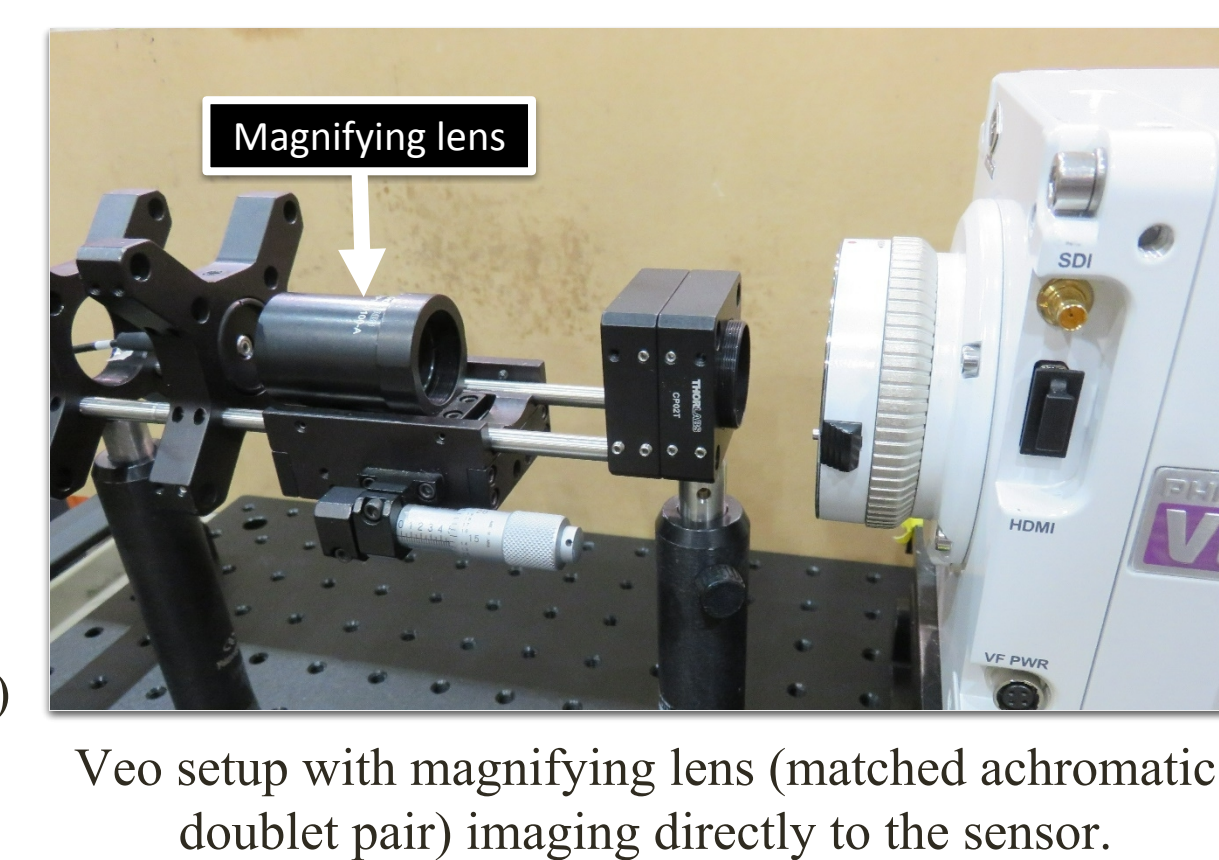
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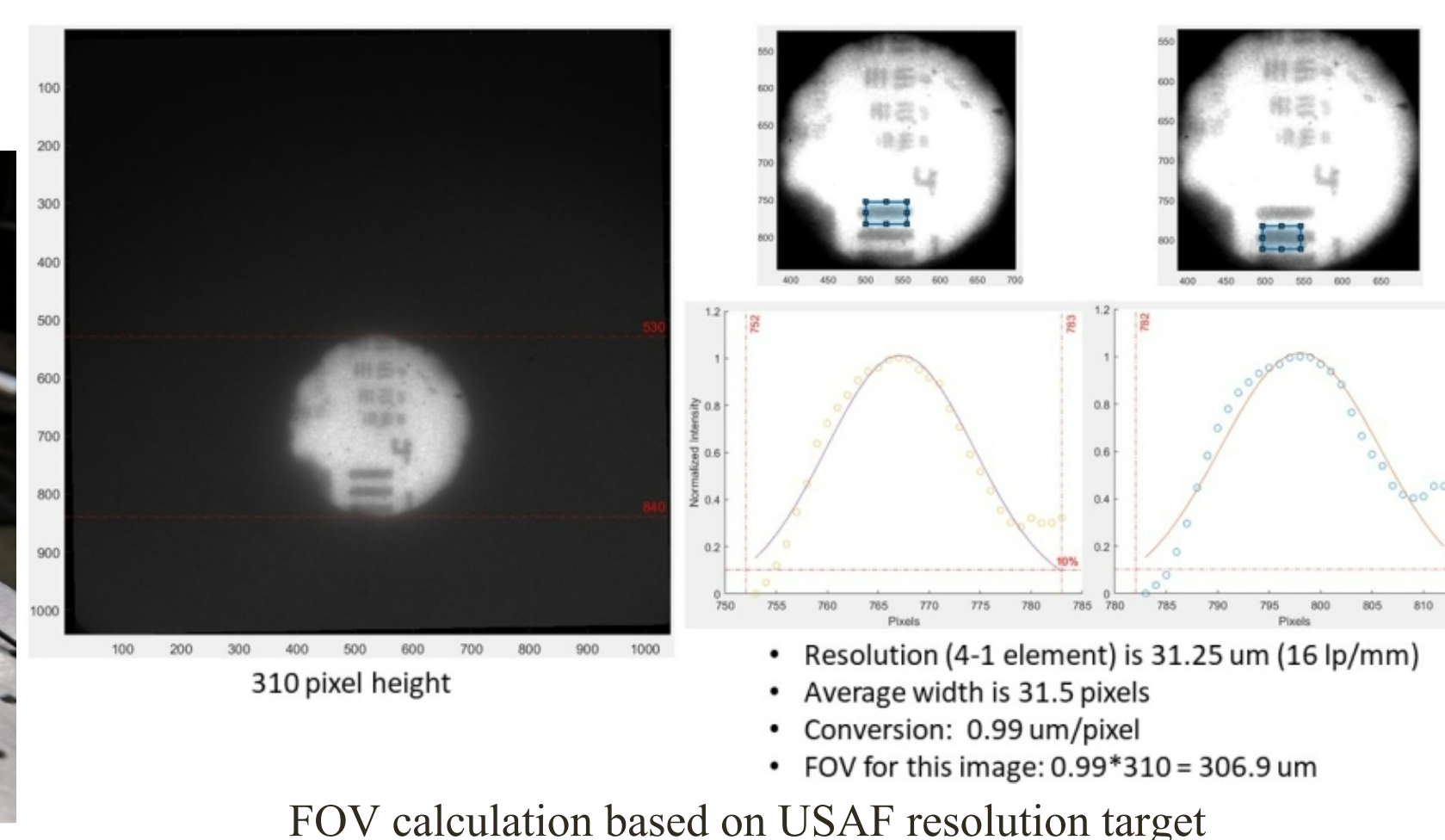
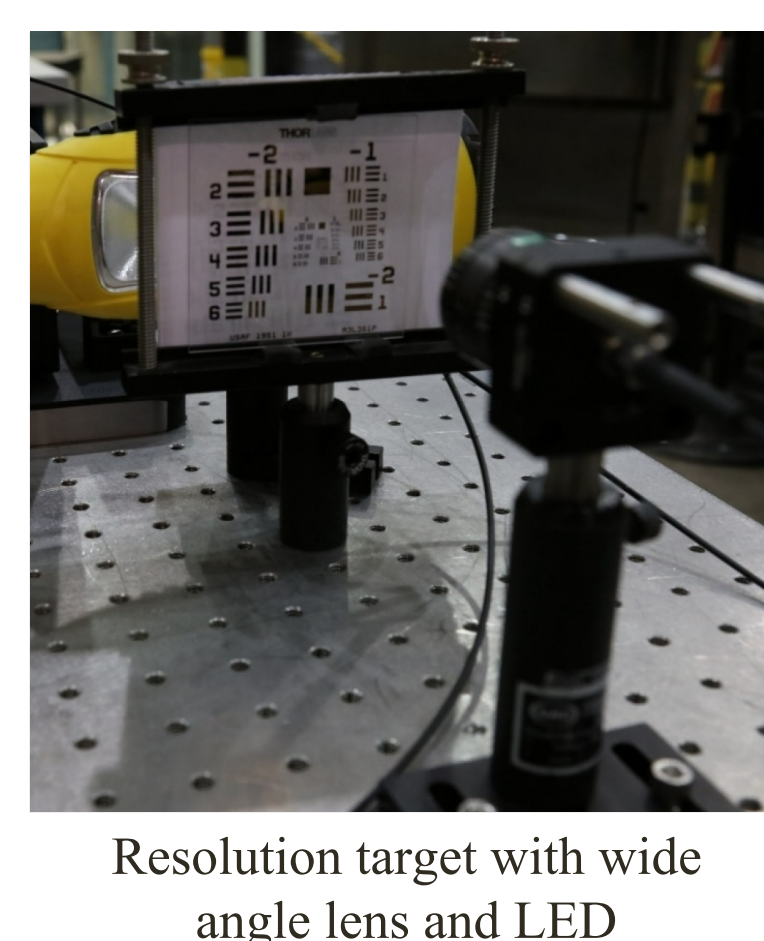
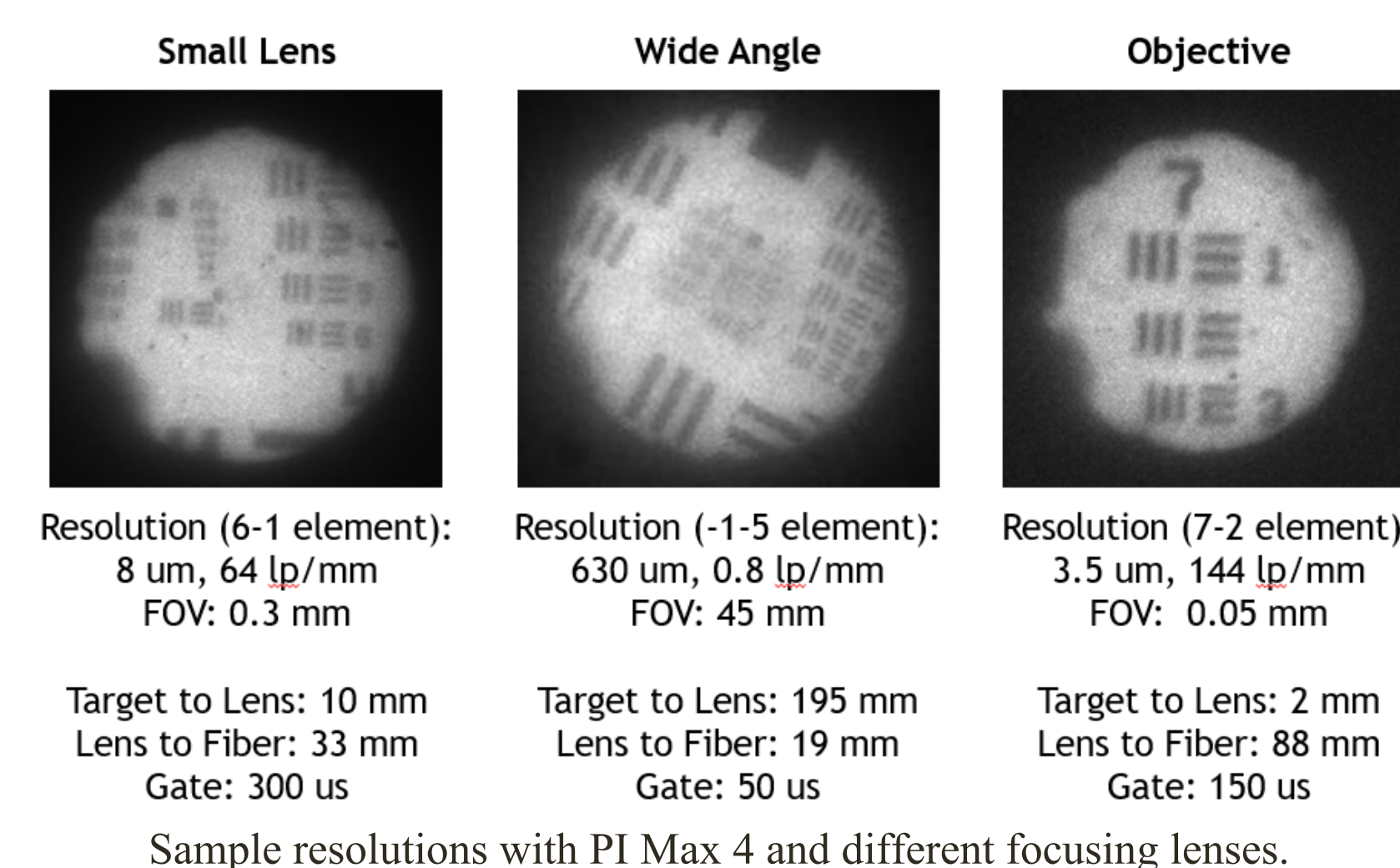


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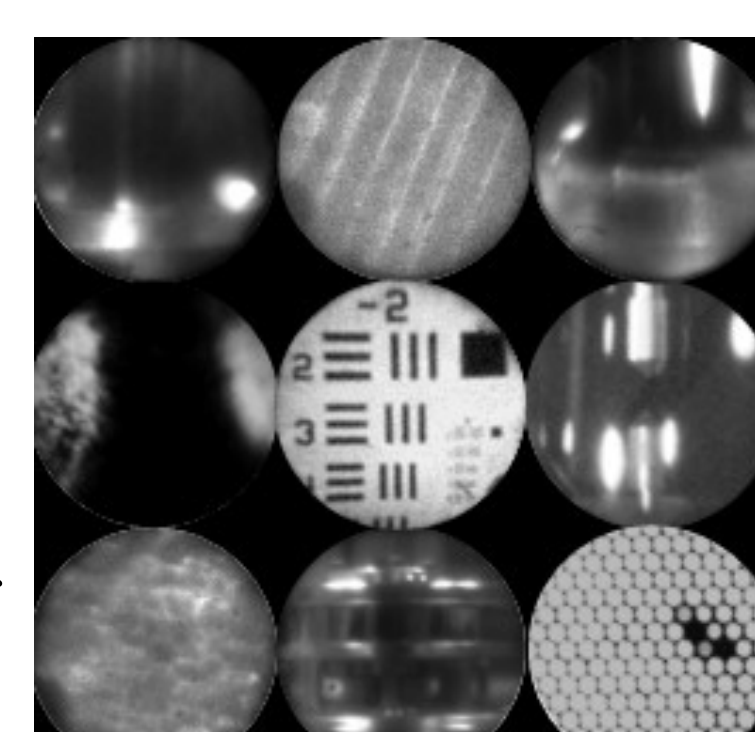


Bench Testing

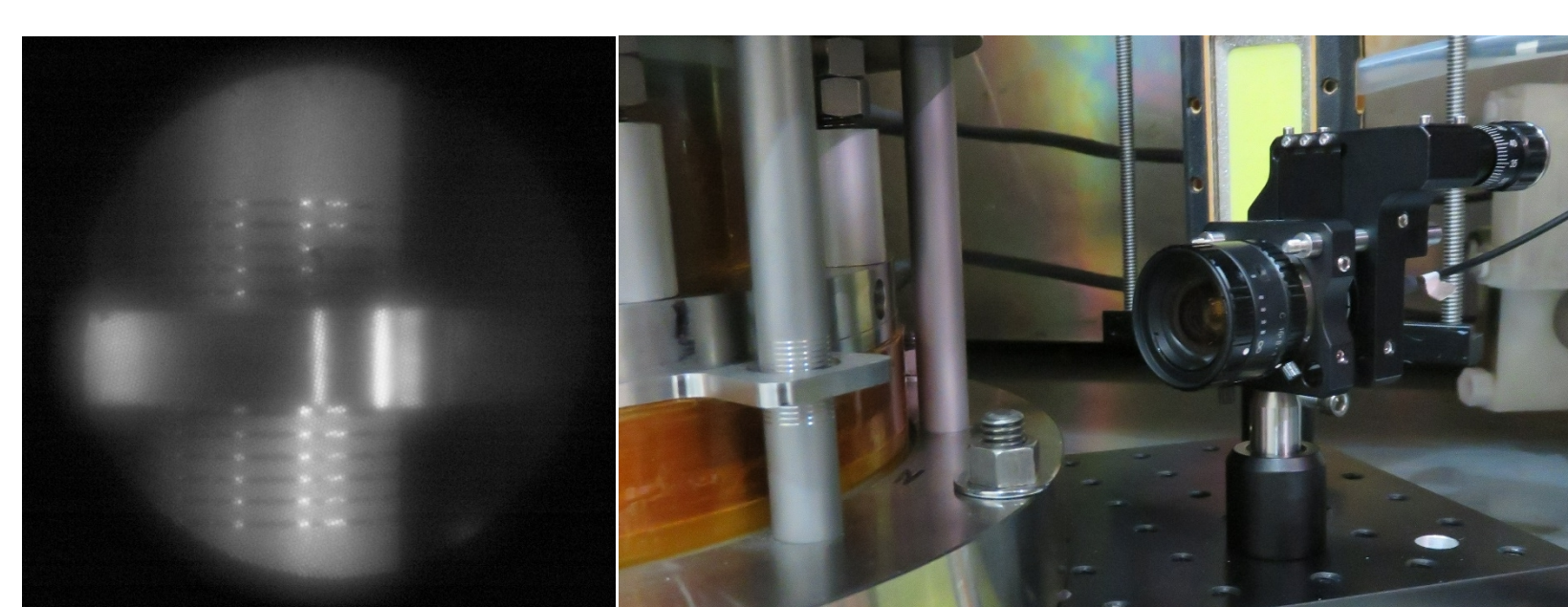


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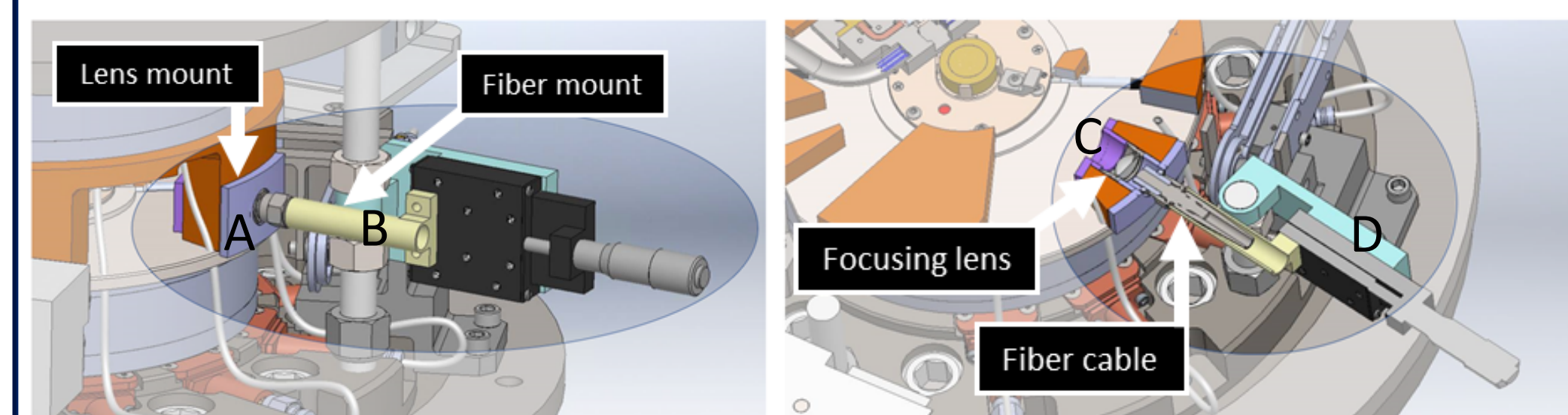
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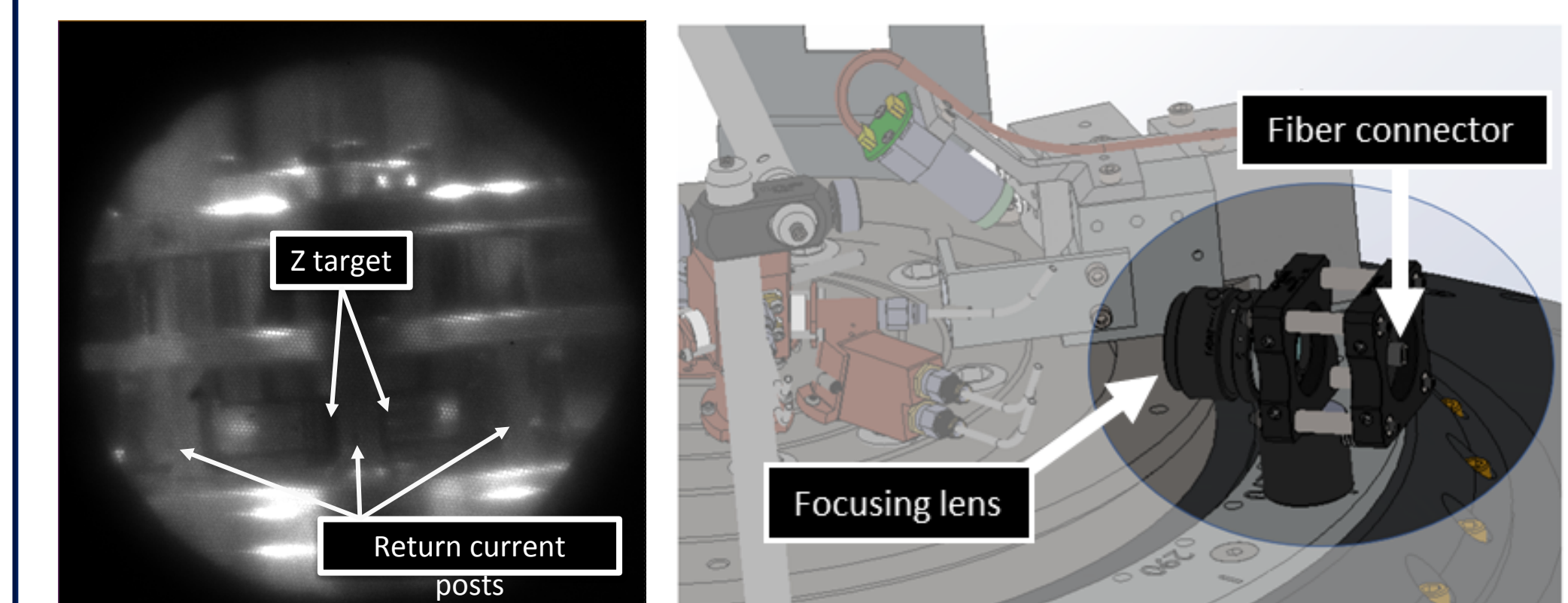
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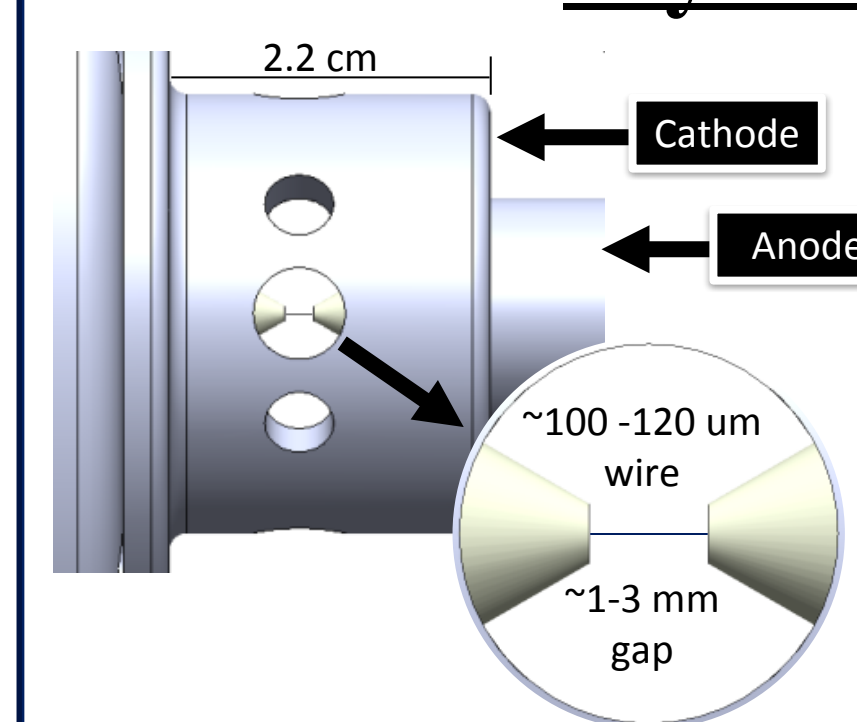


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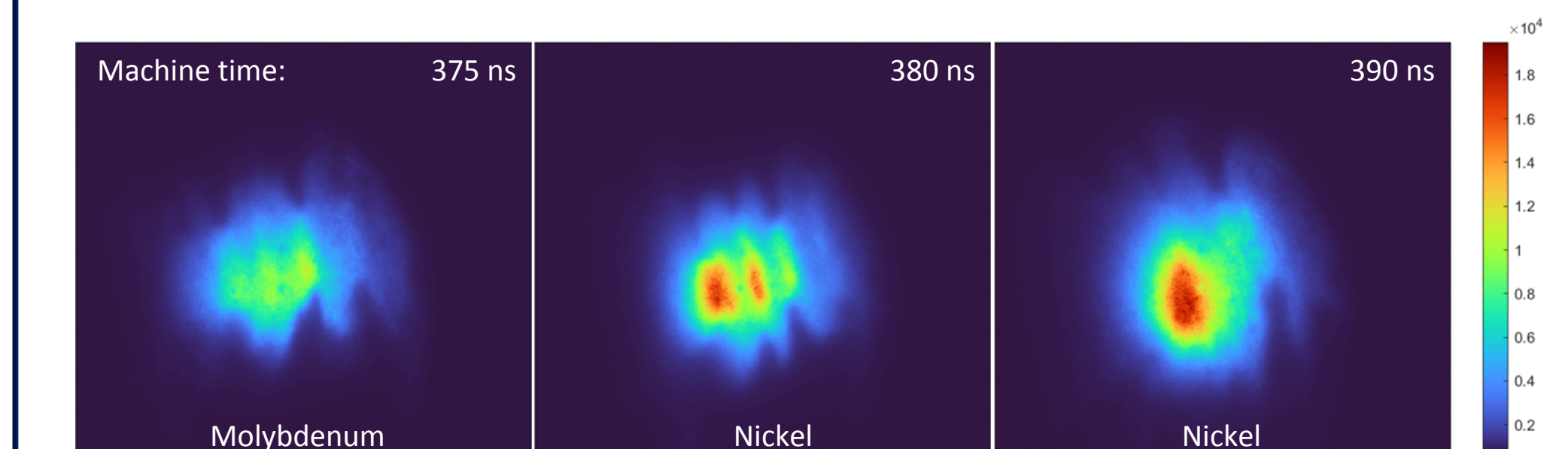
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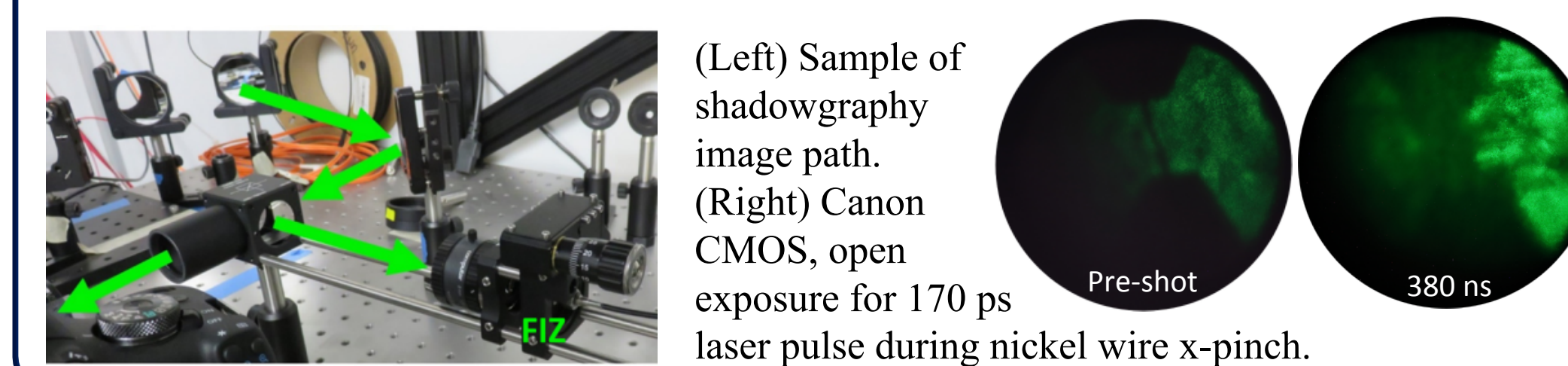
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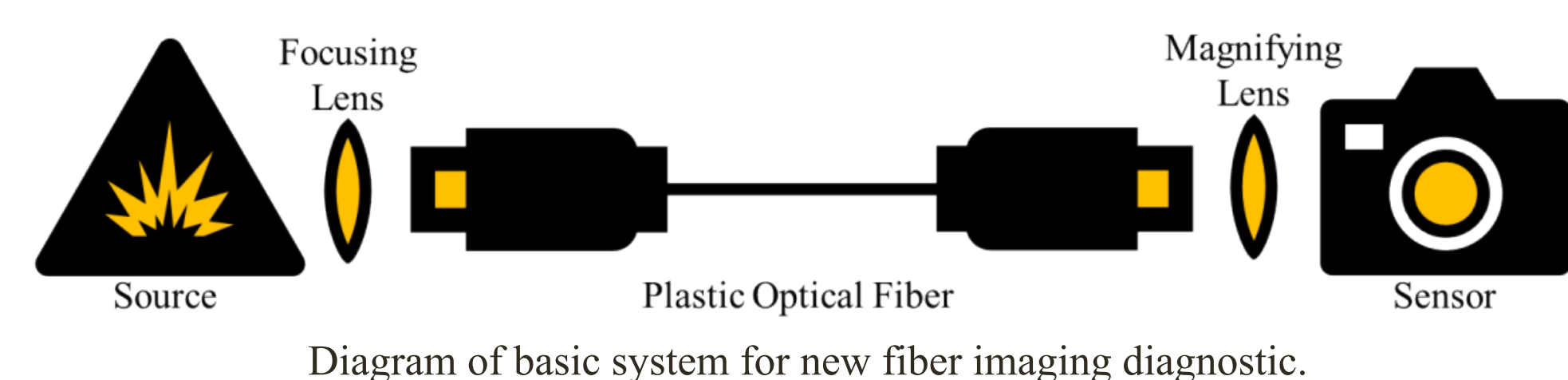
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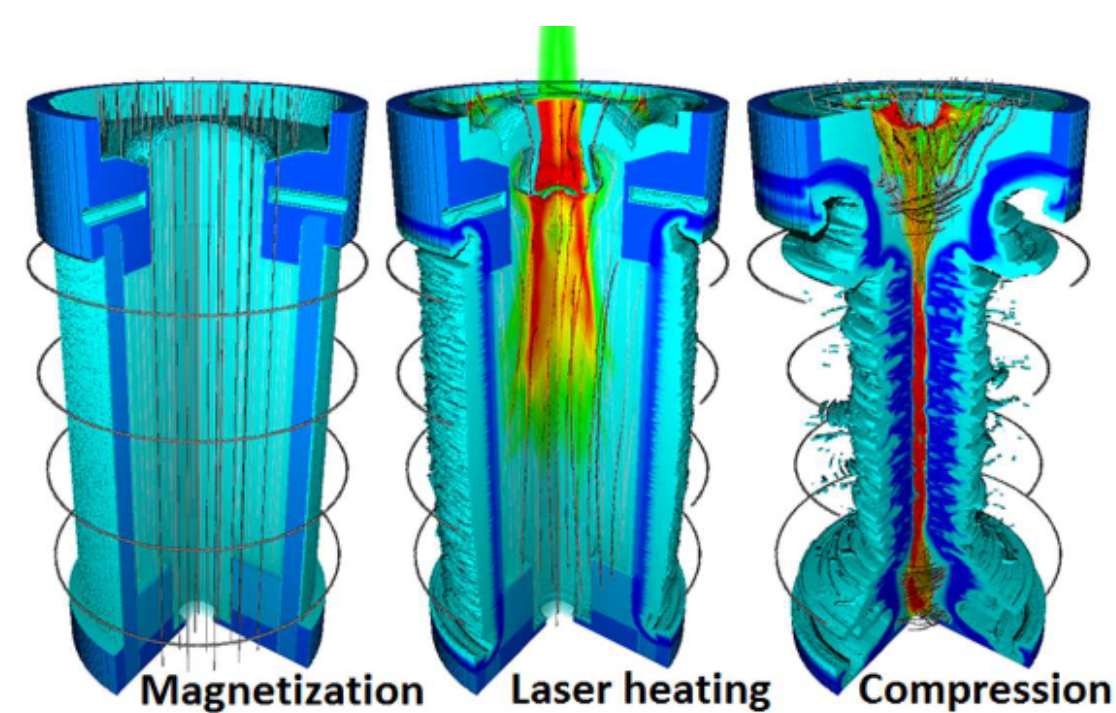
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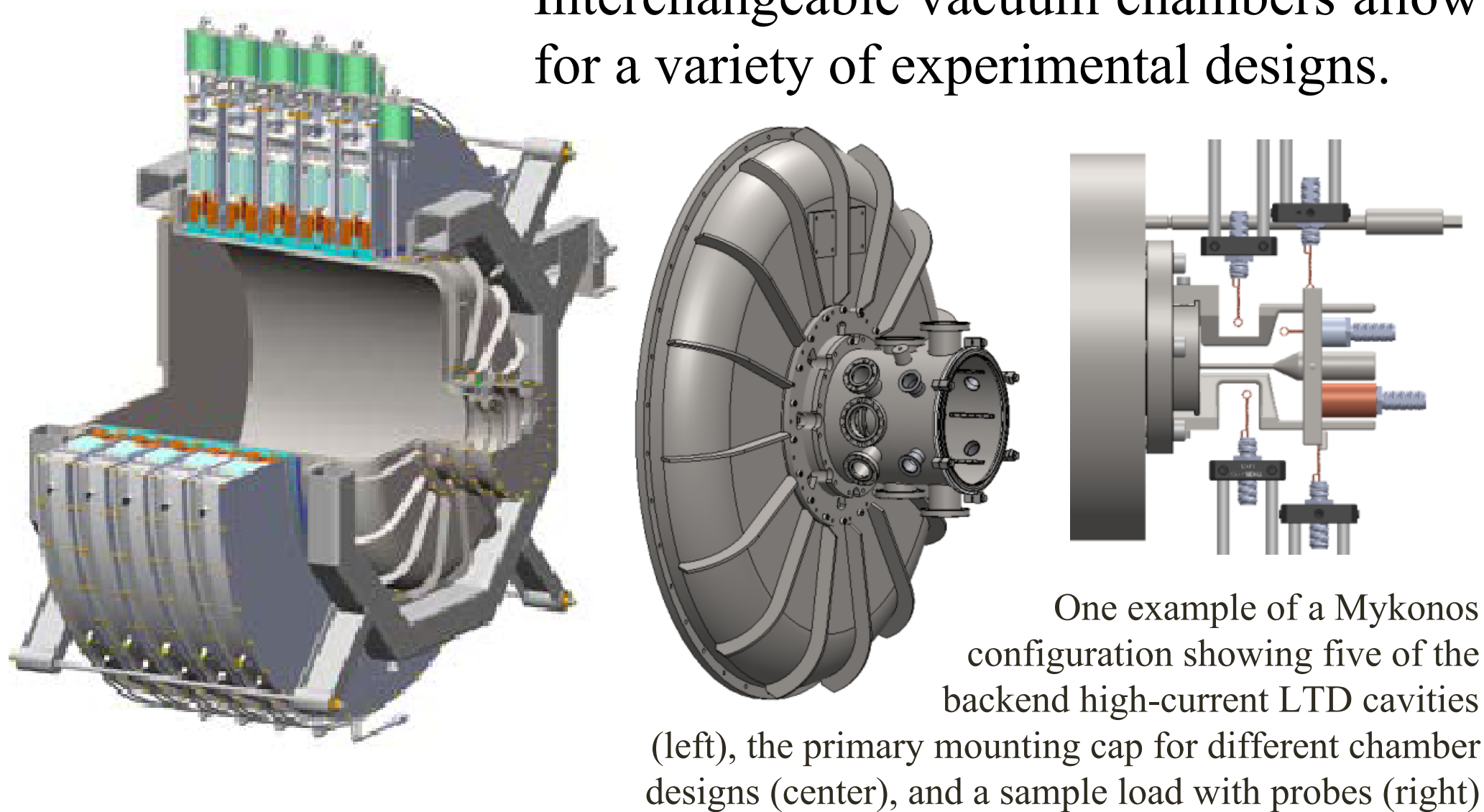
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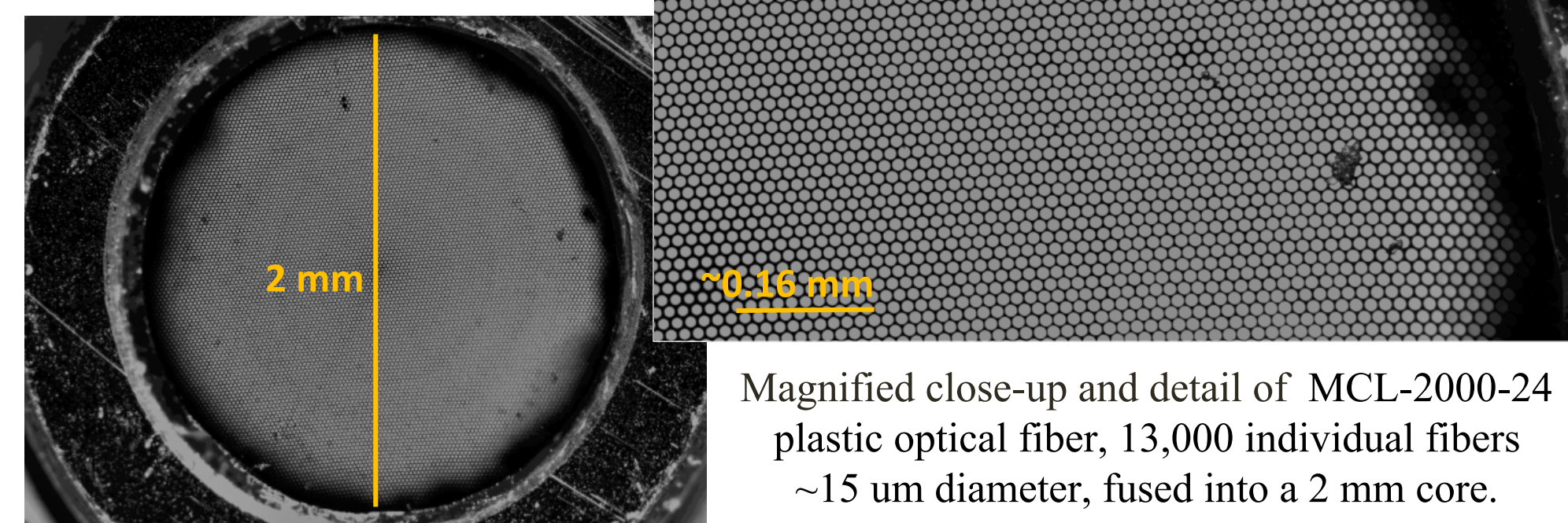
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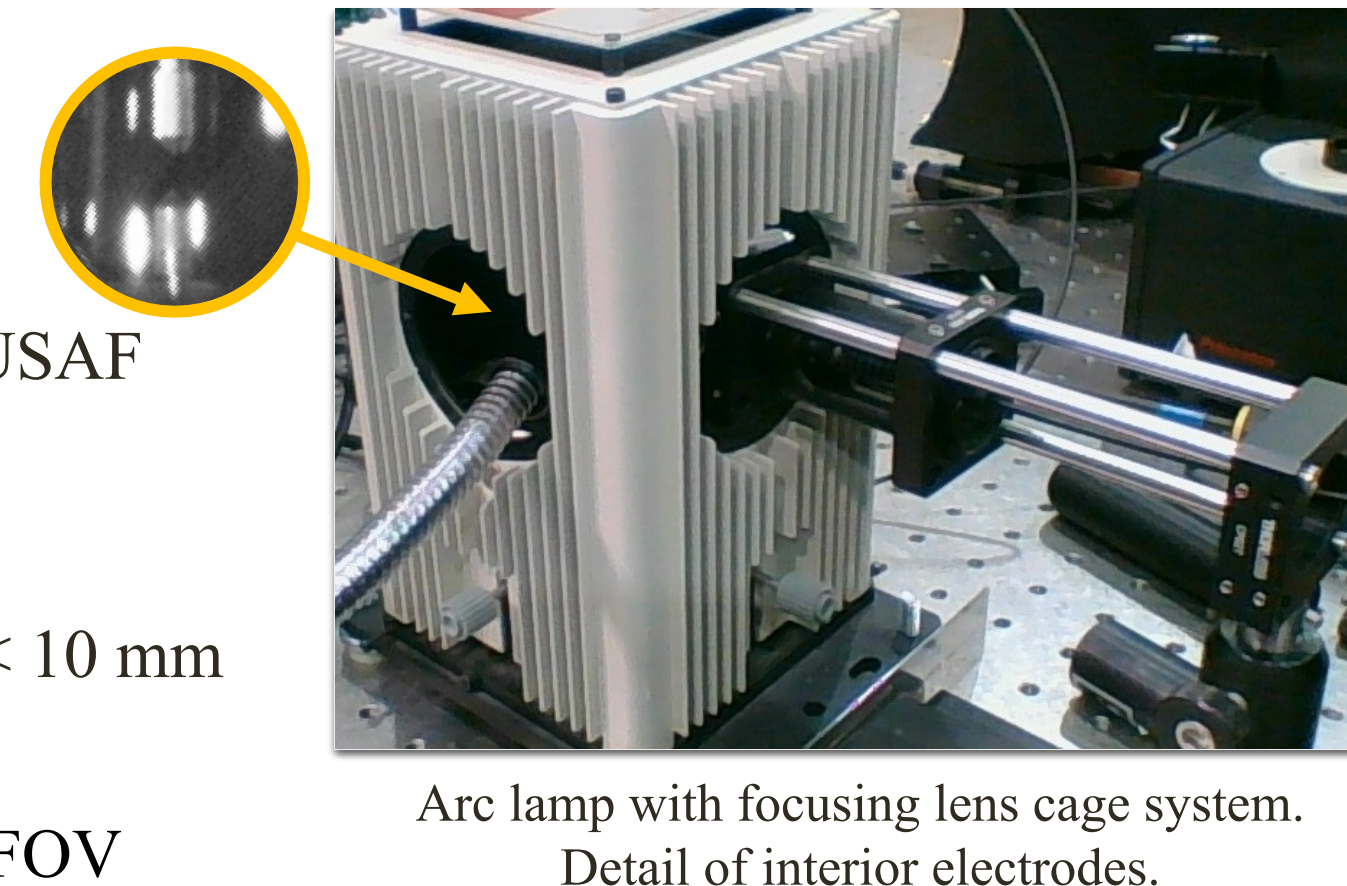
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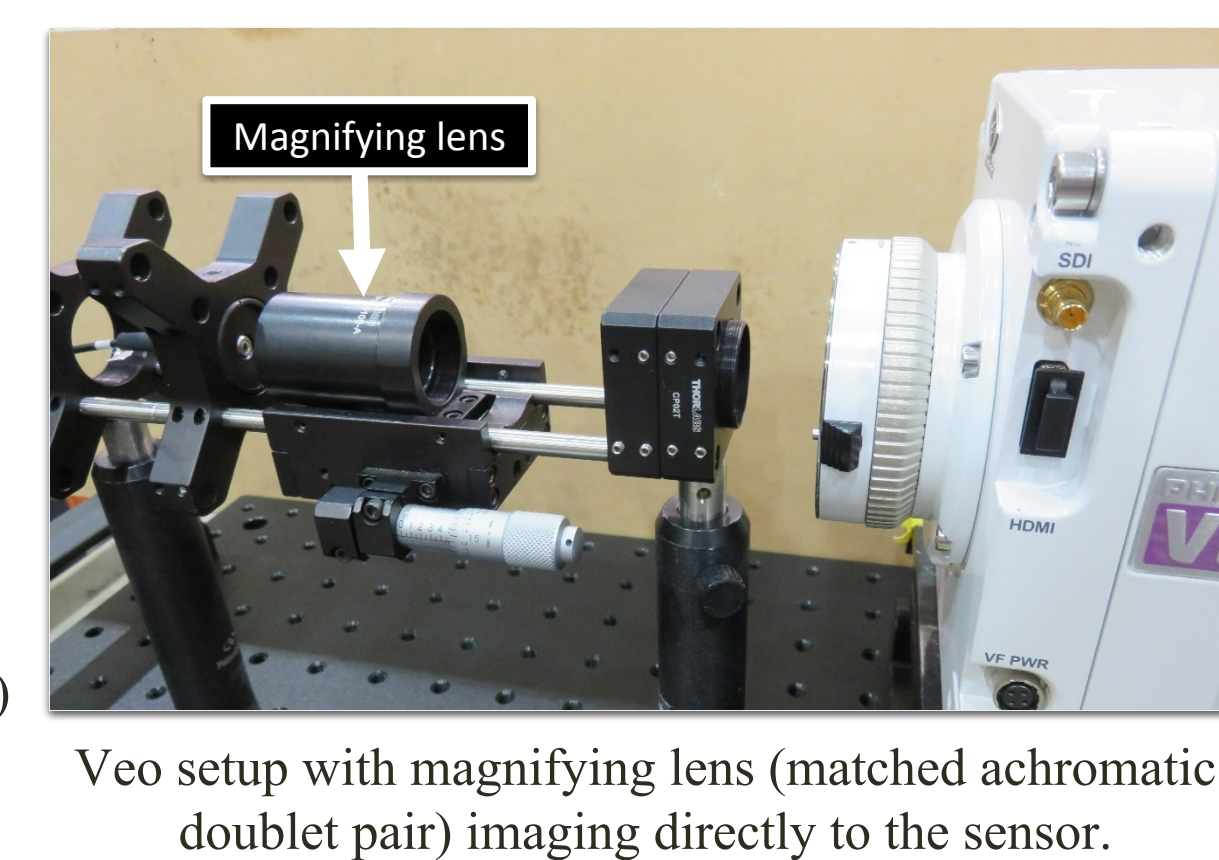
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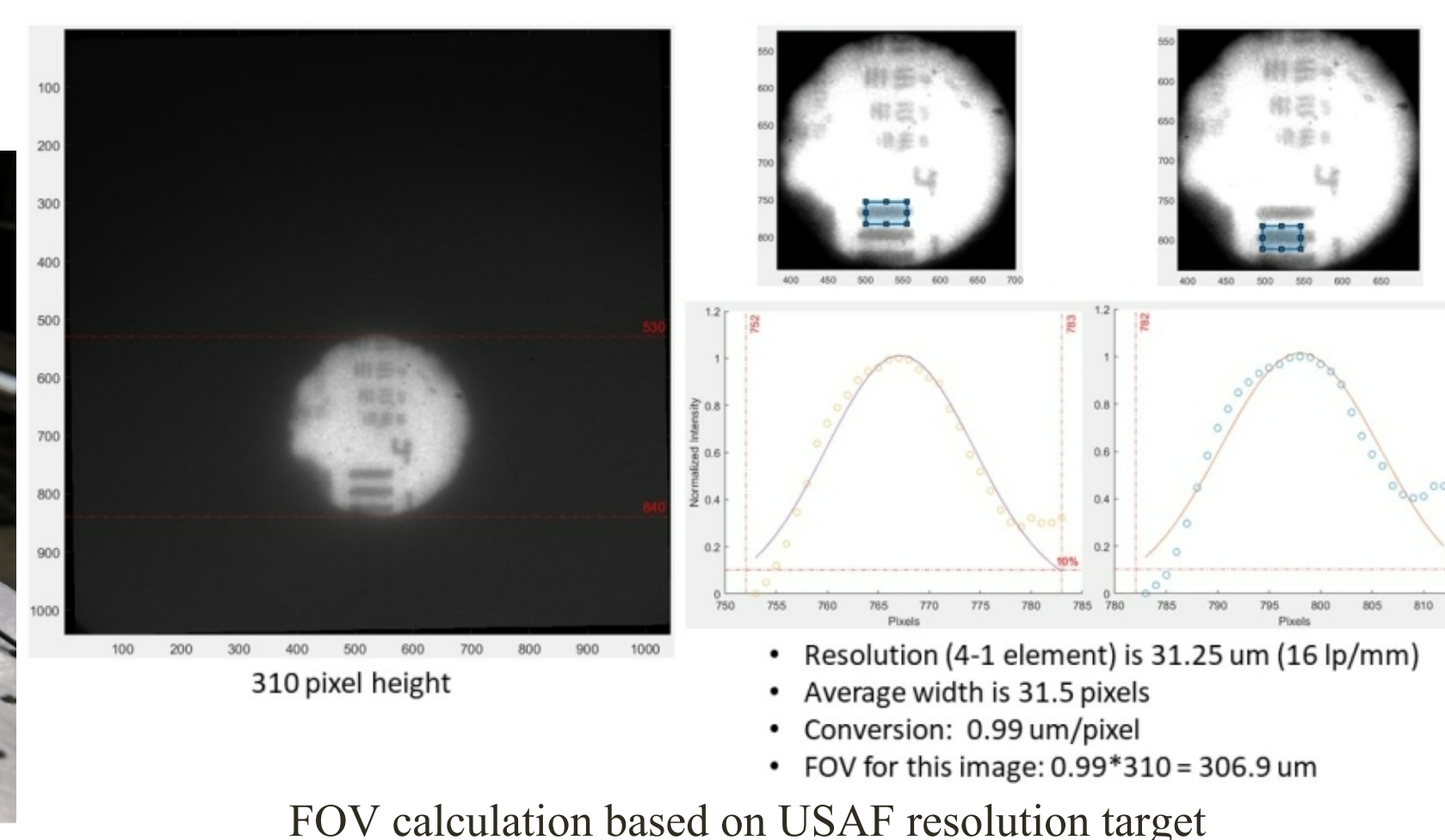
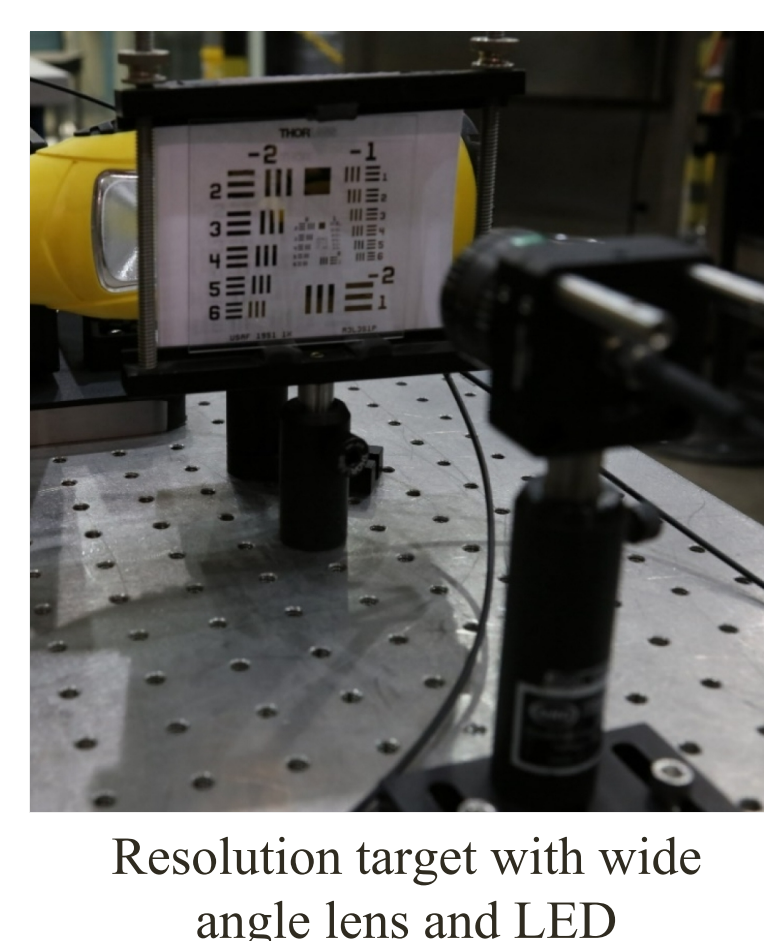
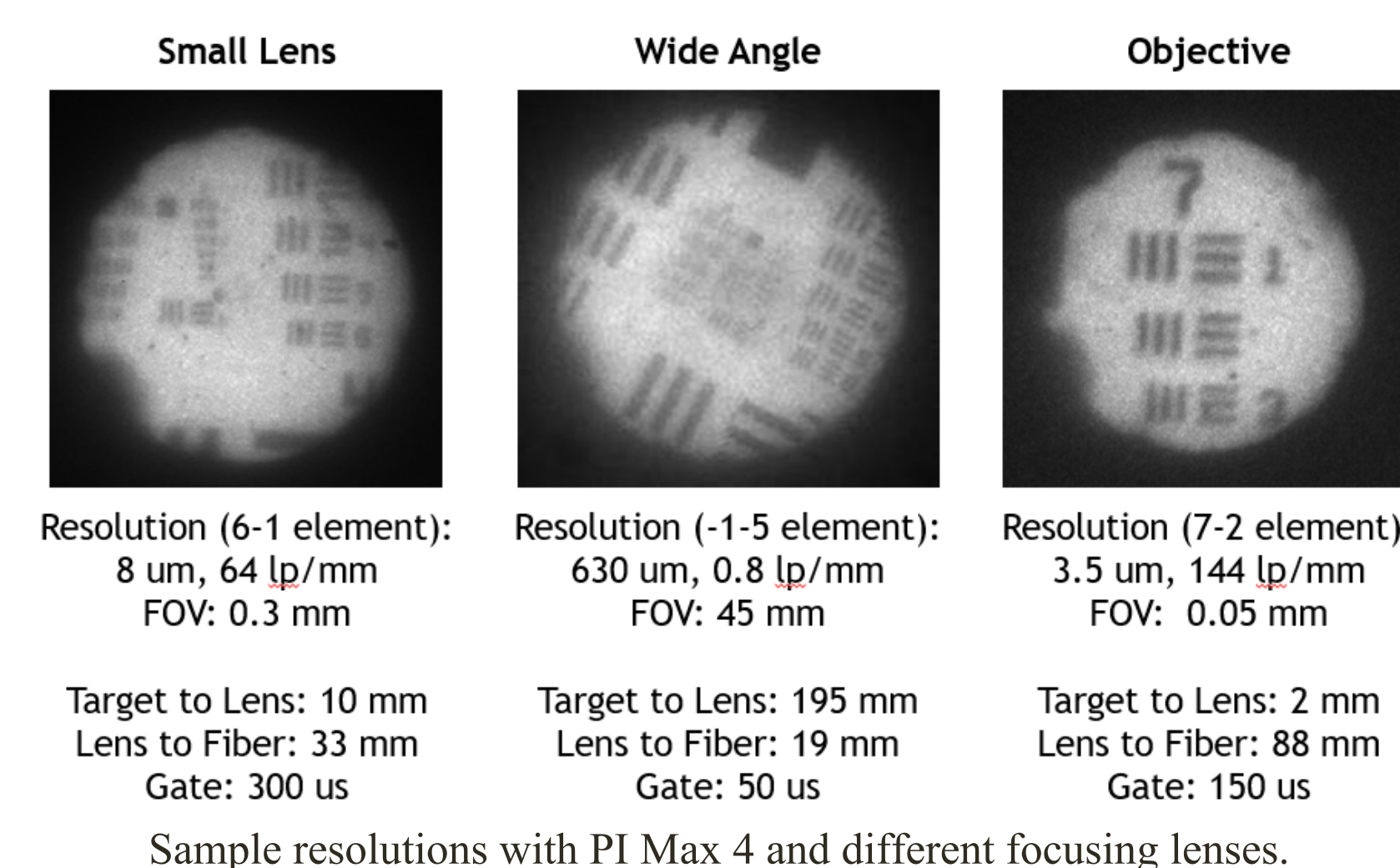


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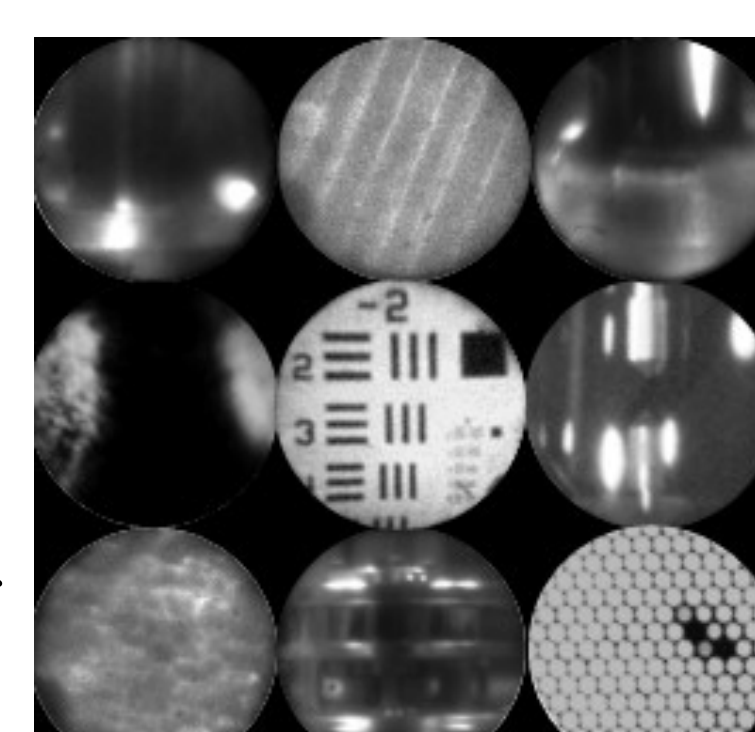


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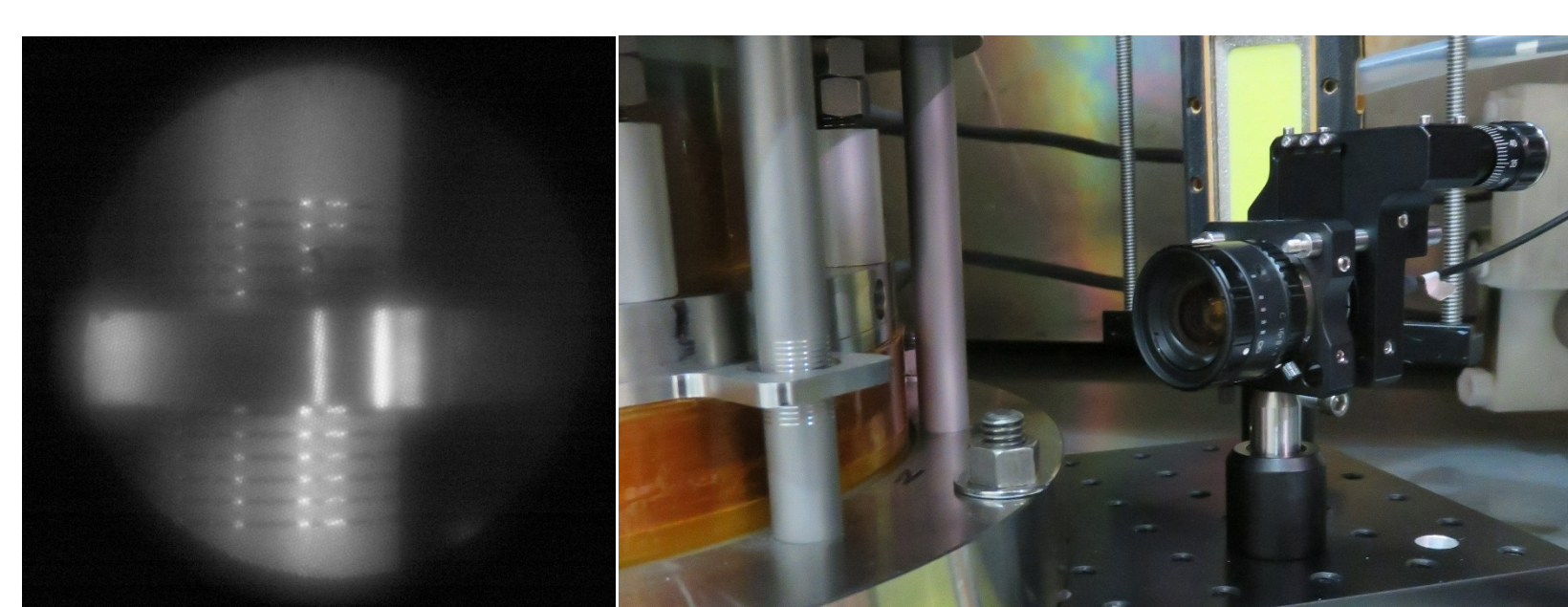


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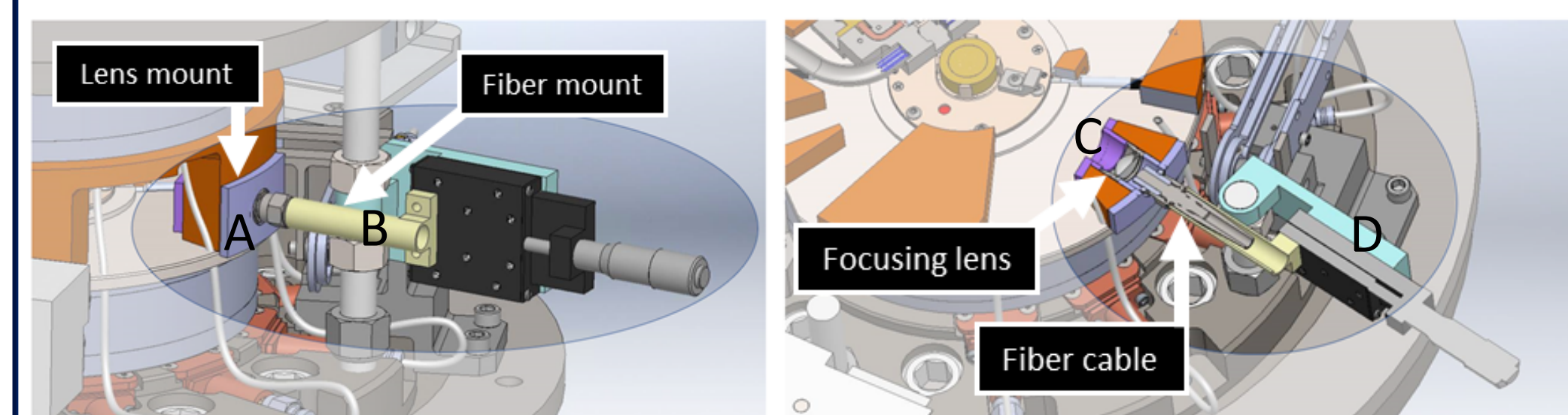
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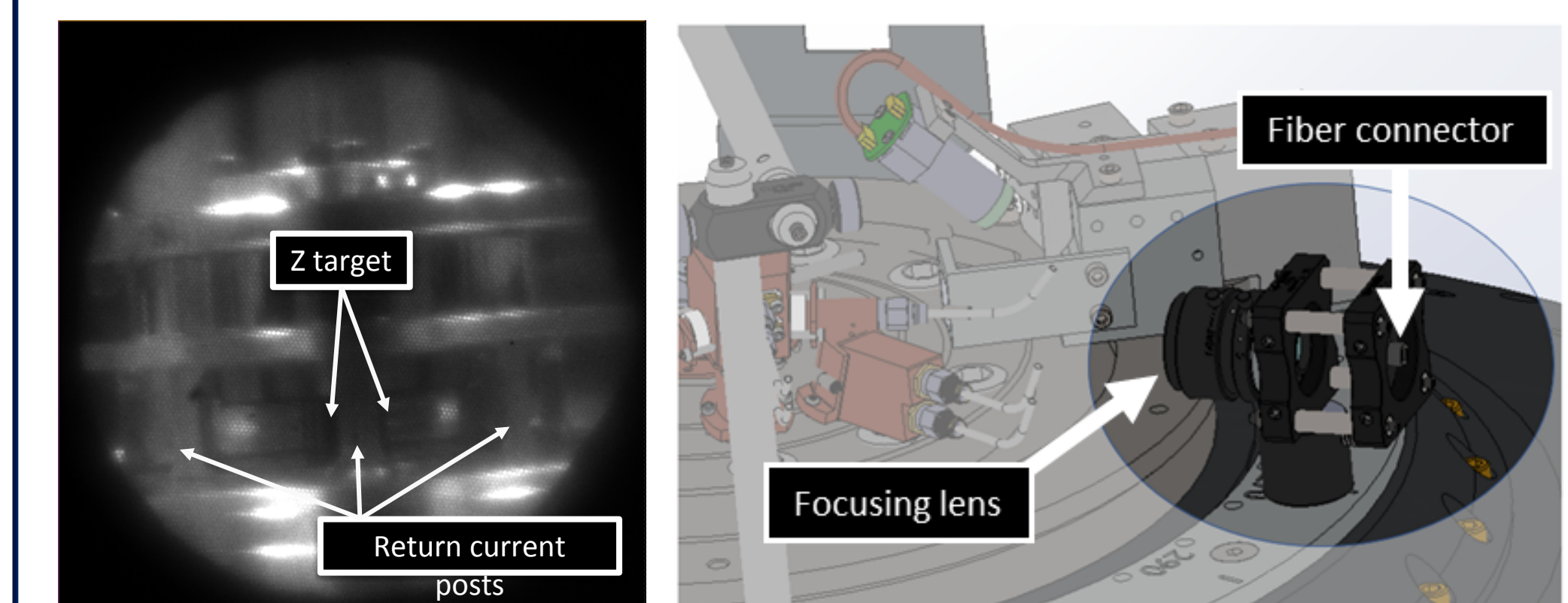
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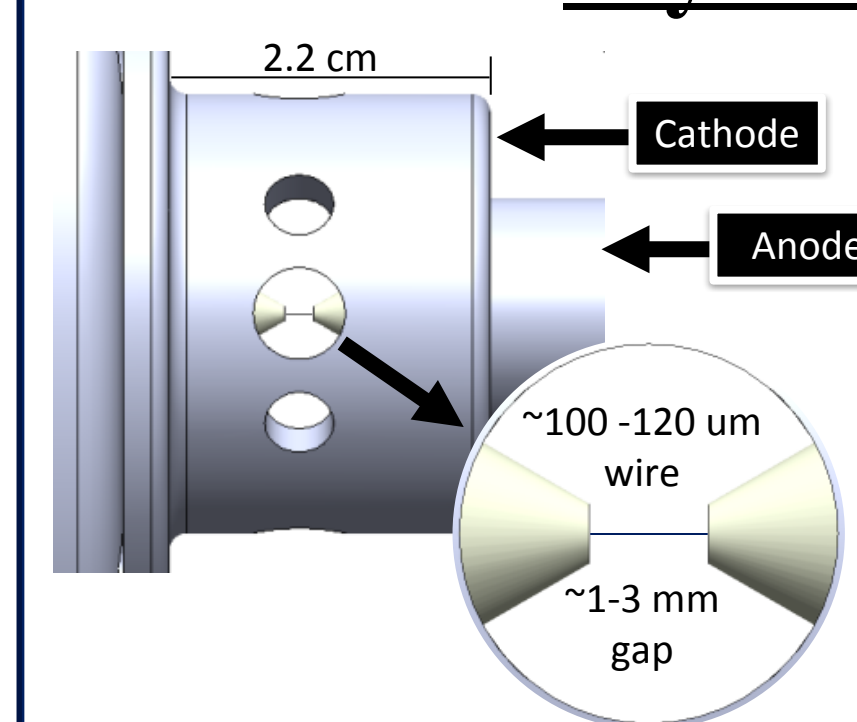


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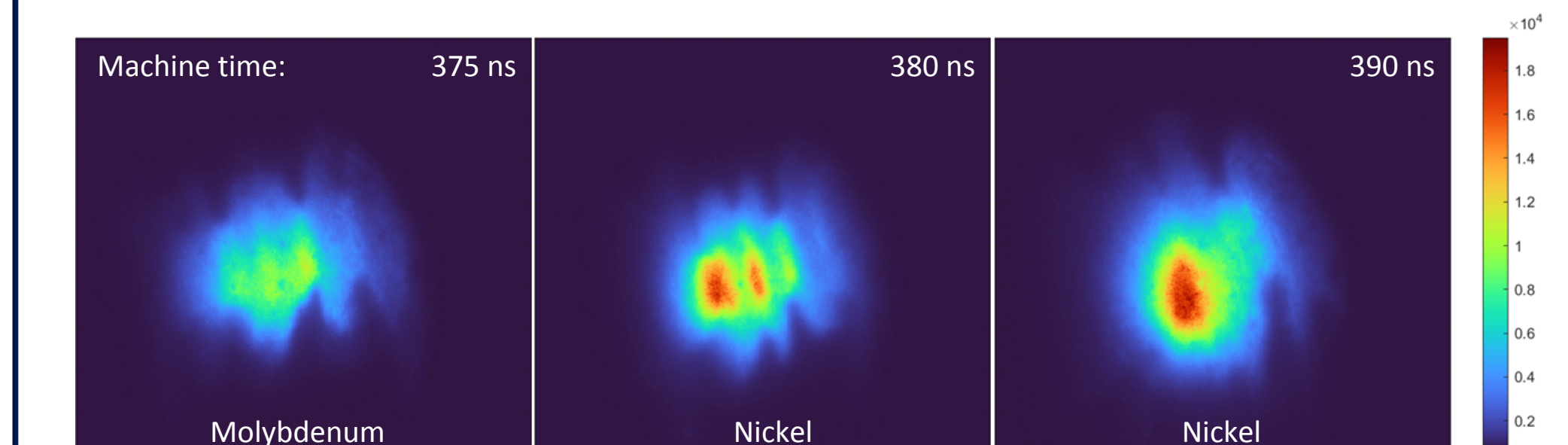
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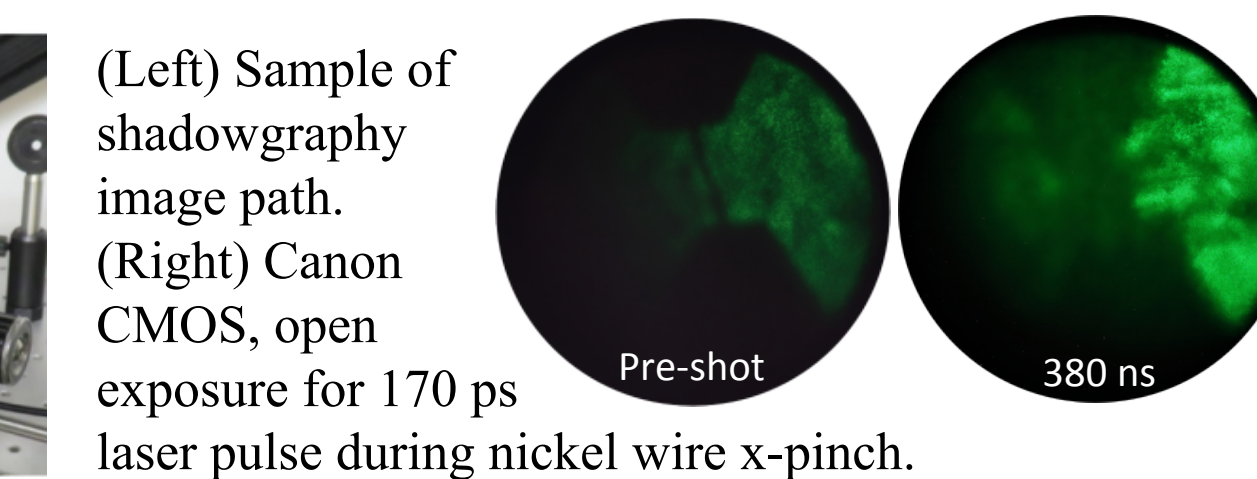
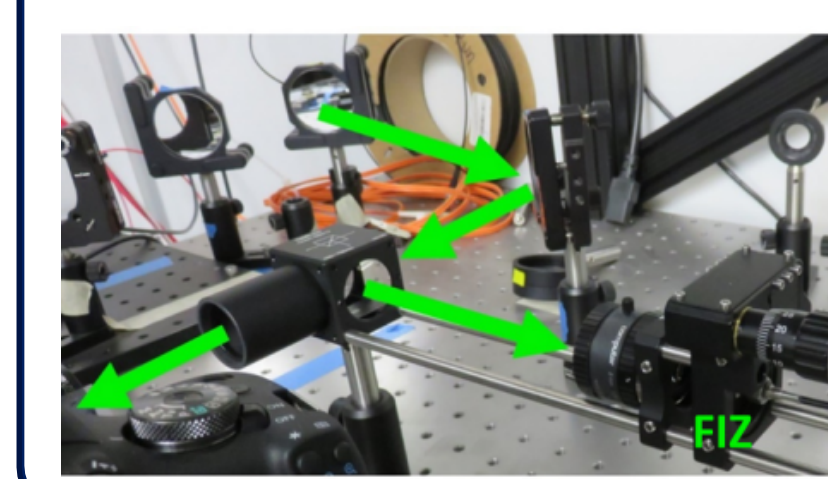
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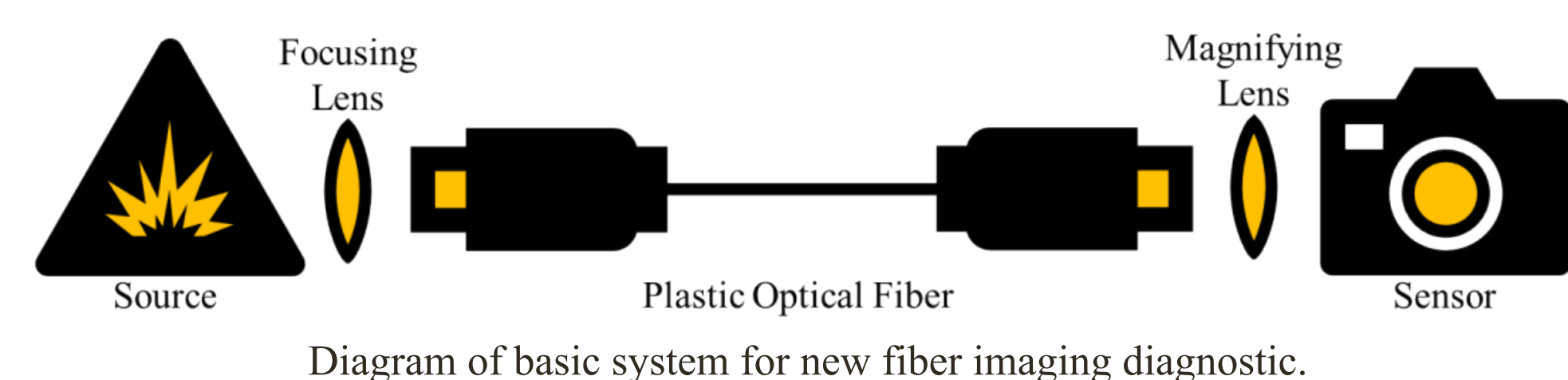
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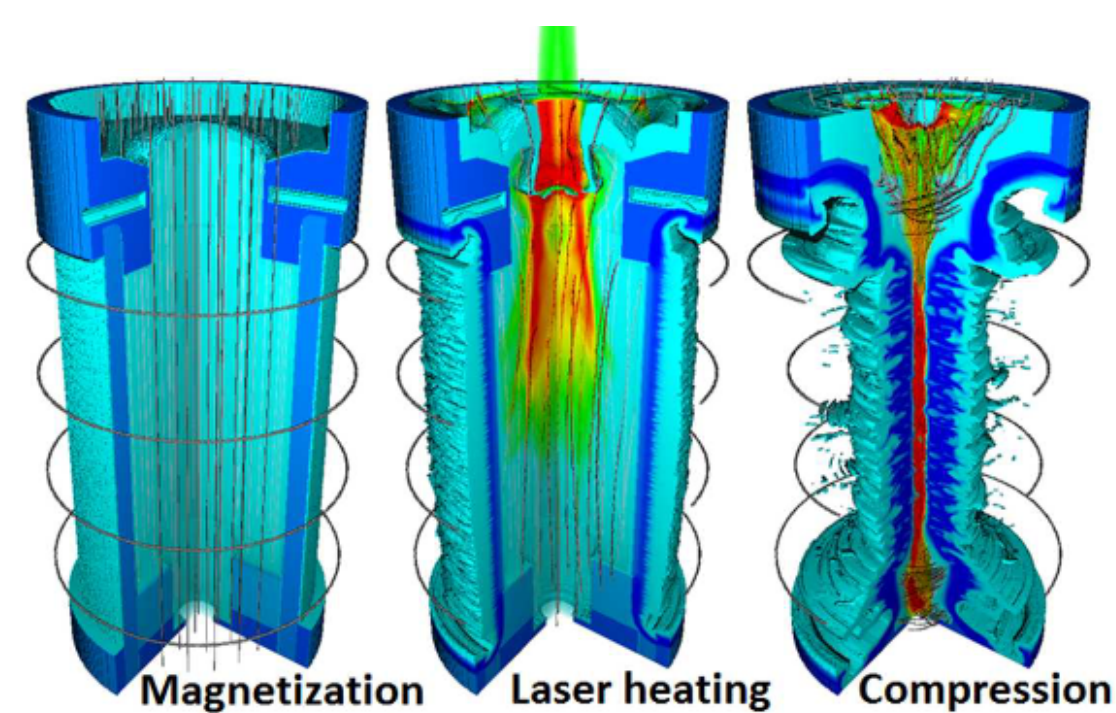
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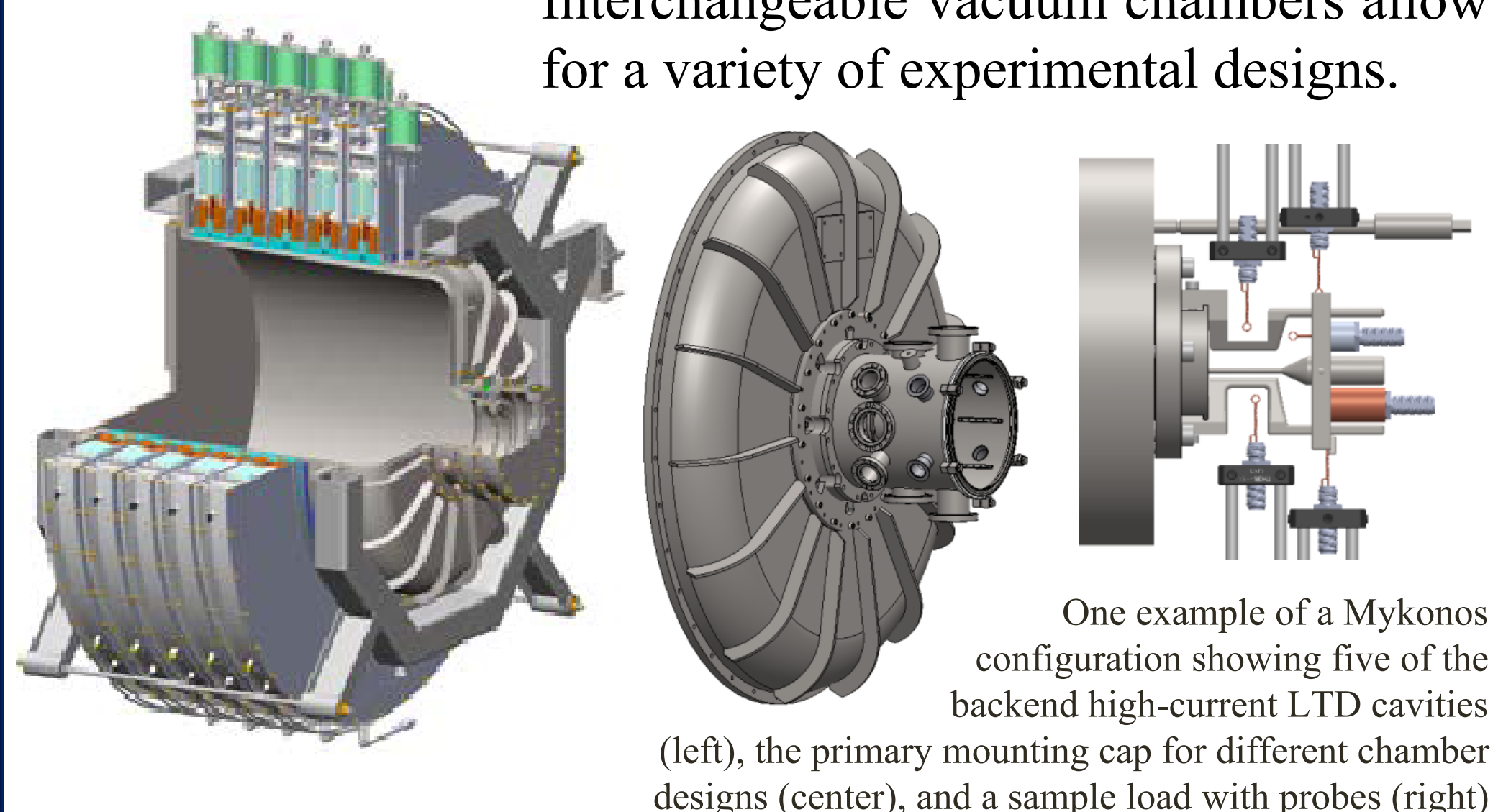
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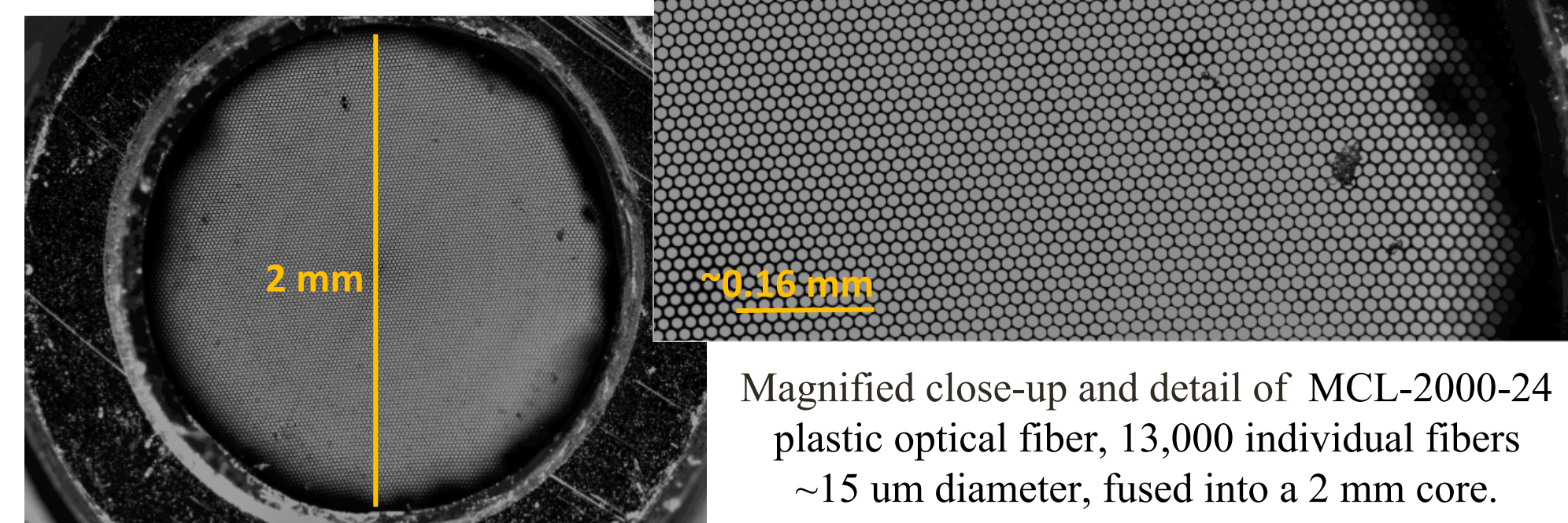
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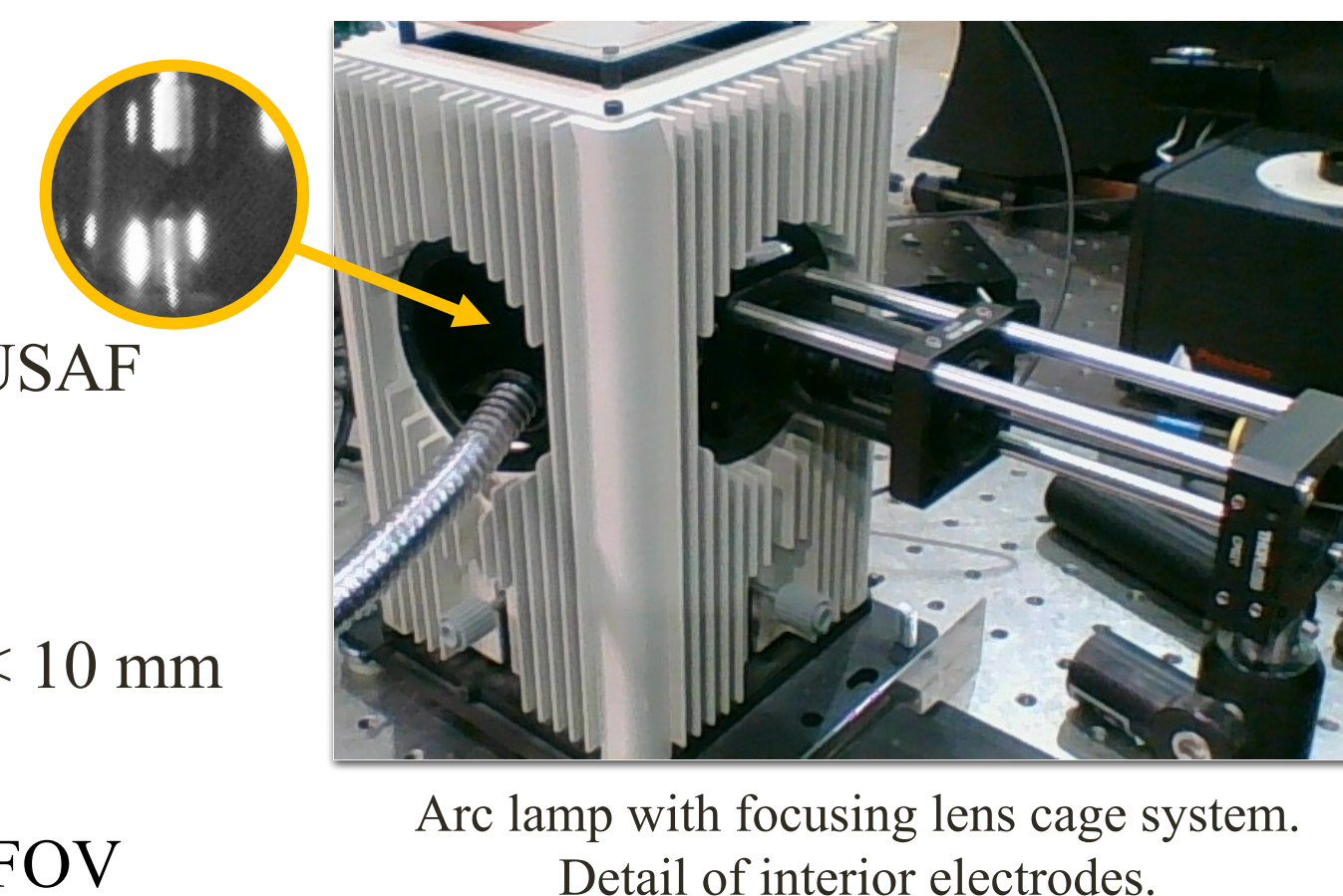
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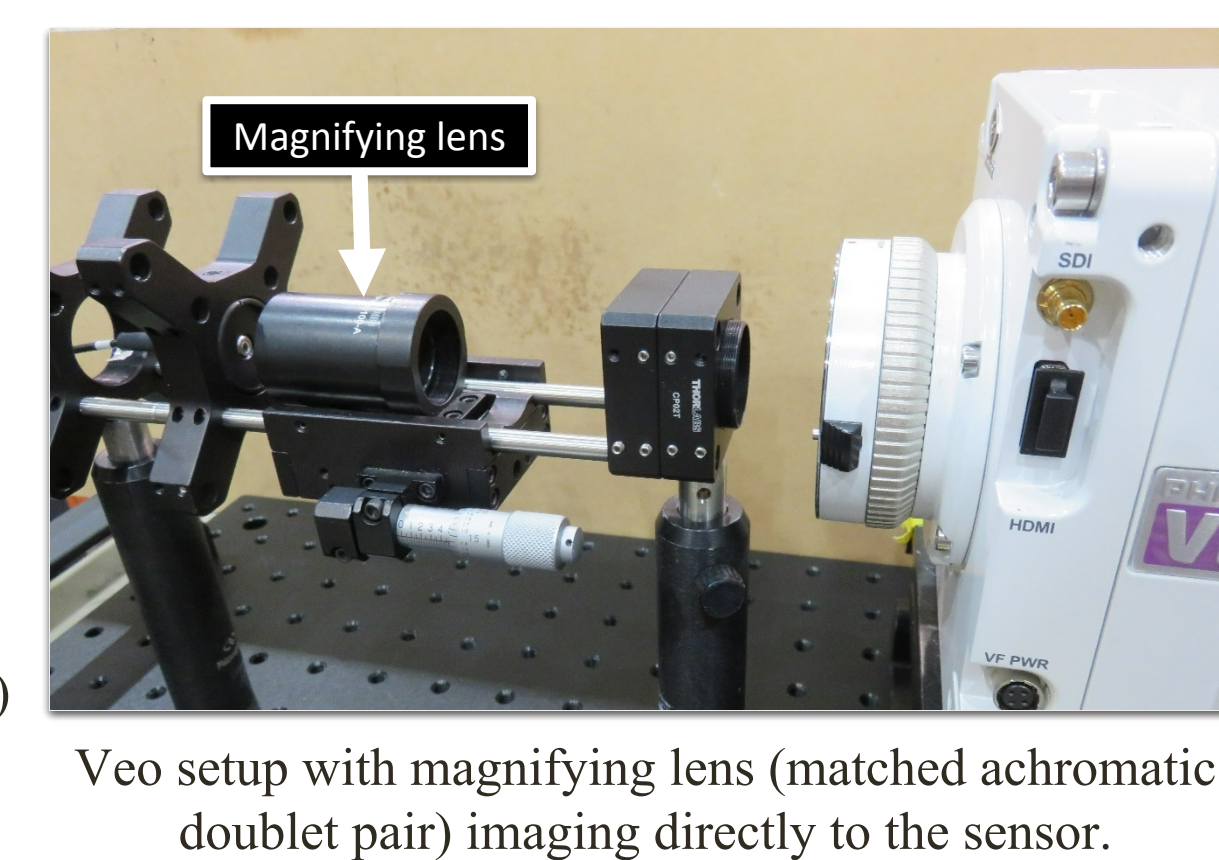
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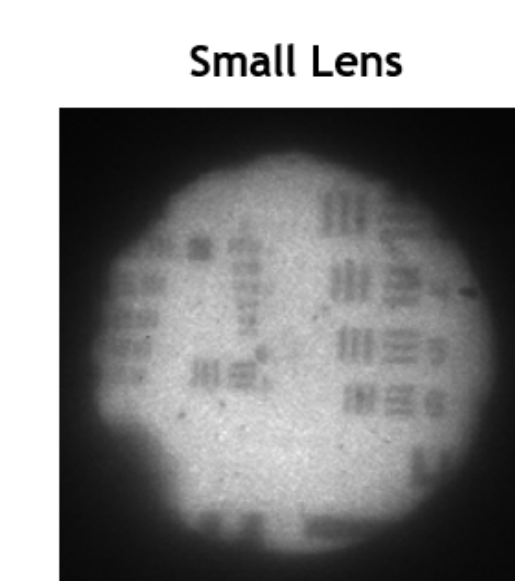
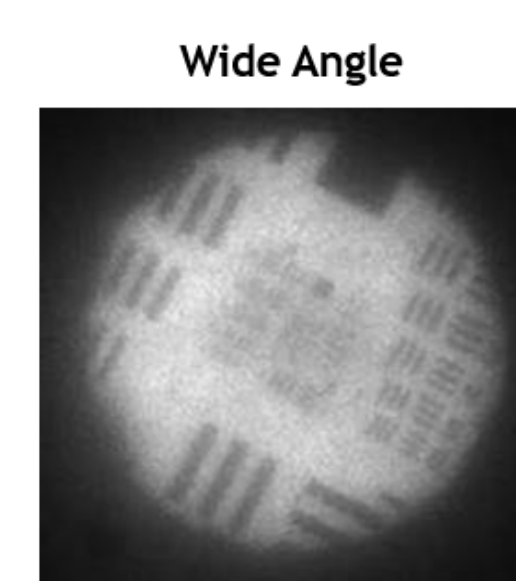
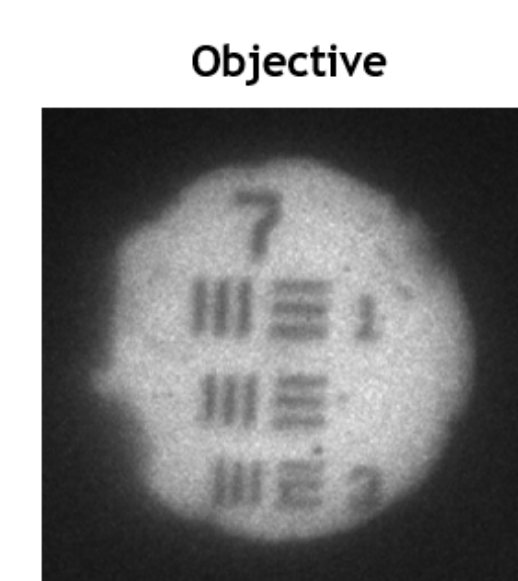


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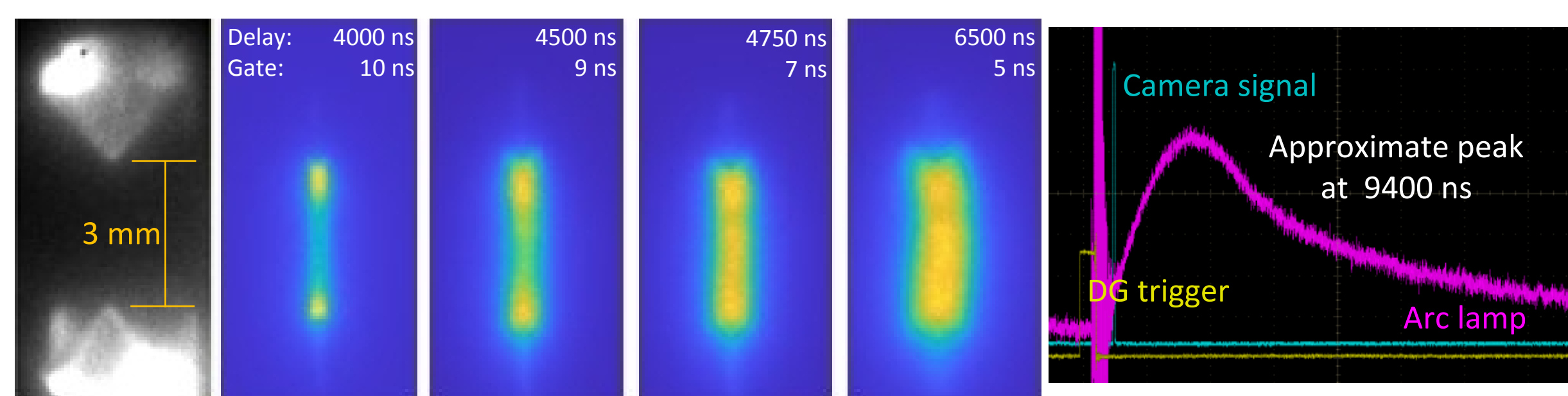
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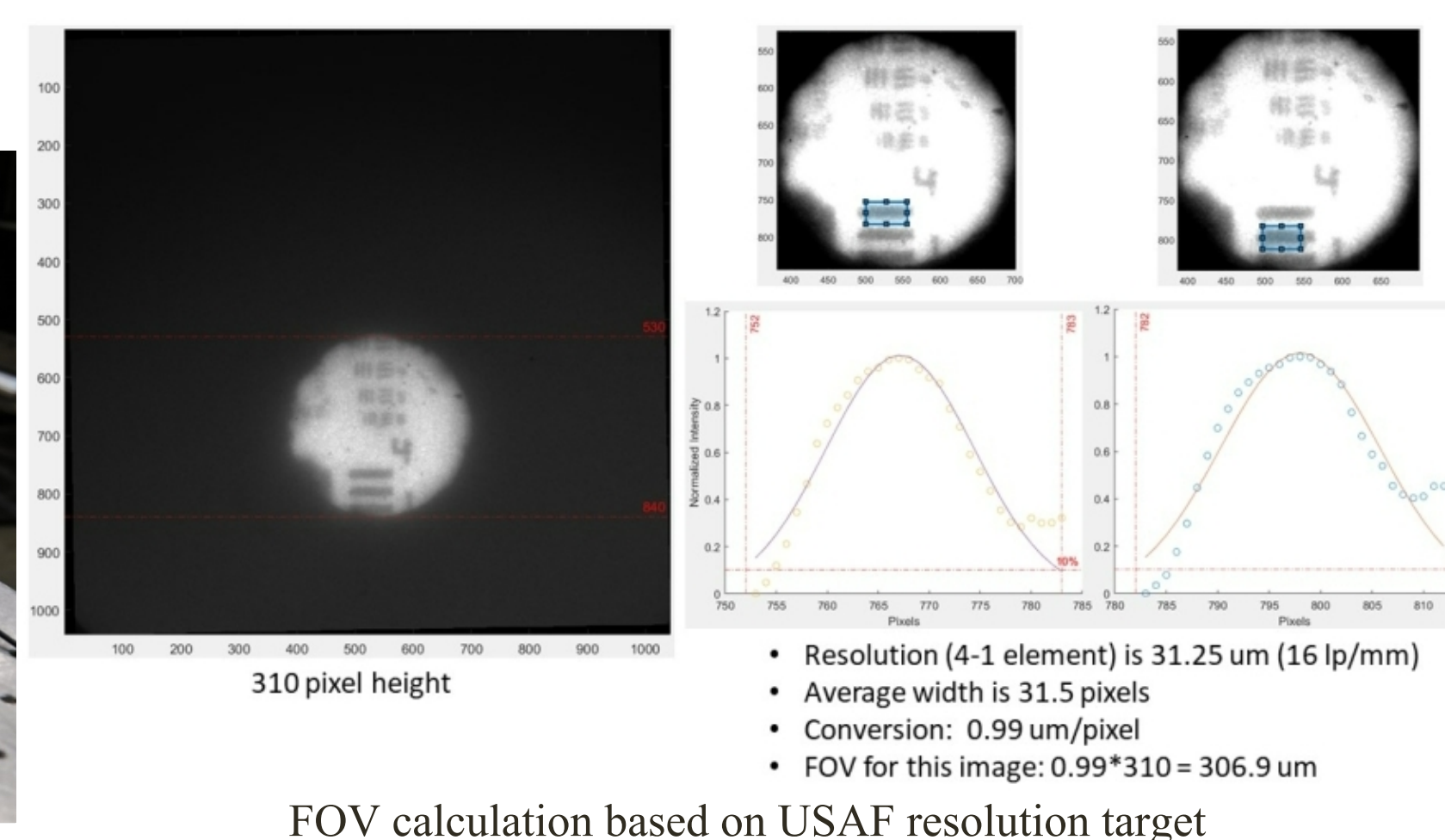
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Small Lens	Wide Angle	Objective
		
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Target to Lens: 10 mm Lens to Fiber: 33 mm Gate: 300 us	Target to Lens: 195 mm Lens to Fiber: 19 mm Gate: 50 us	Target to Lens: 2 mm Lens to Fiber: 88 mm Gate: 150 us

Sample resolutions with PI Max 4 and different focusing lenses.



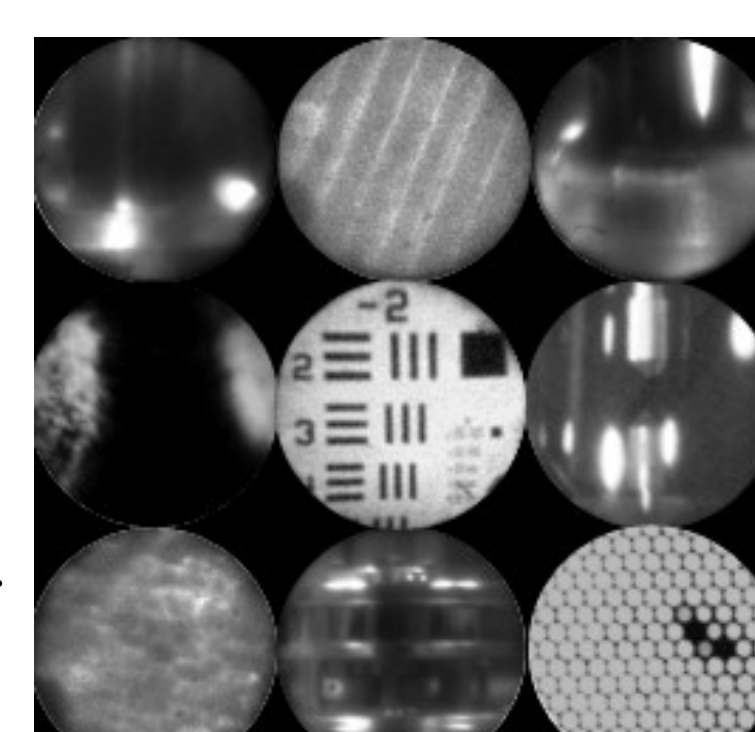
Arc lamp images with a 6 mm diameter focusing lens; 11 mm focal length. Based on electrode image, FOV was ~6 mm. DG triggered the lamp and PI Max 4 camera. Increasing the delay time shifted the exposure to capture the plasma at different stages of the arc.



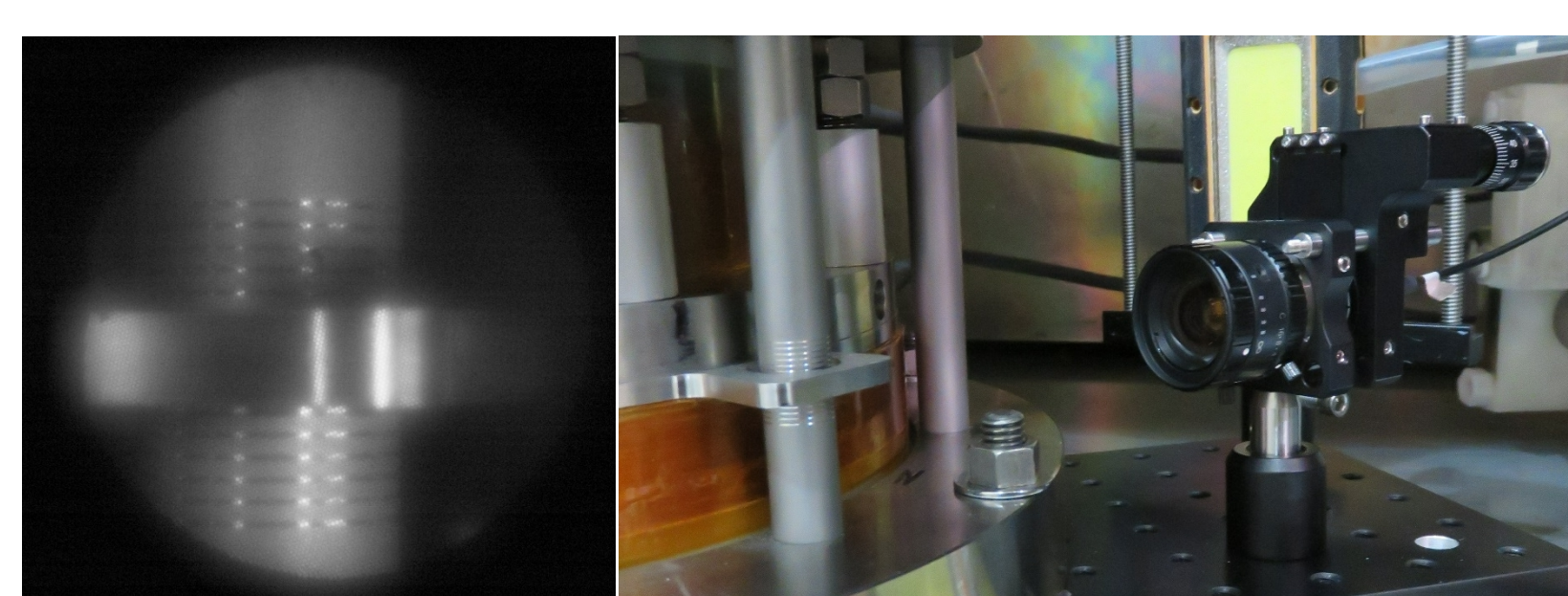
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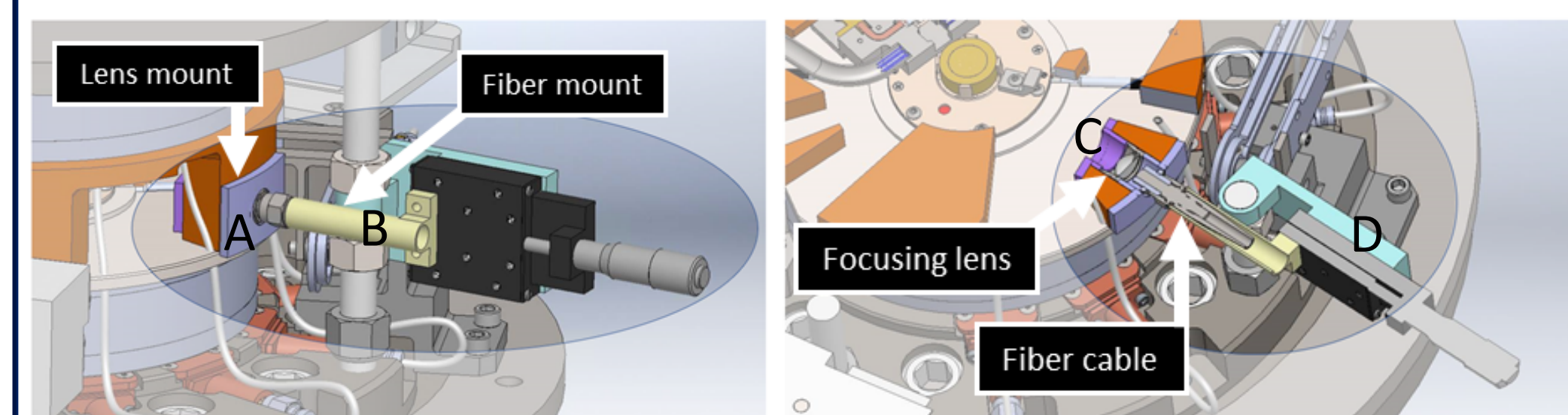
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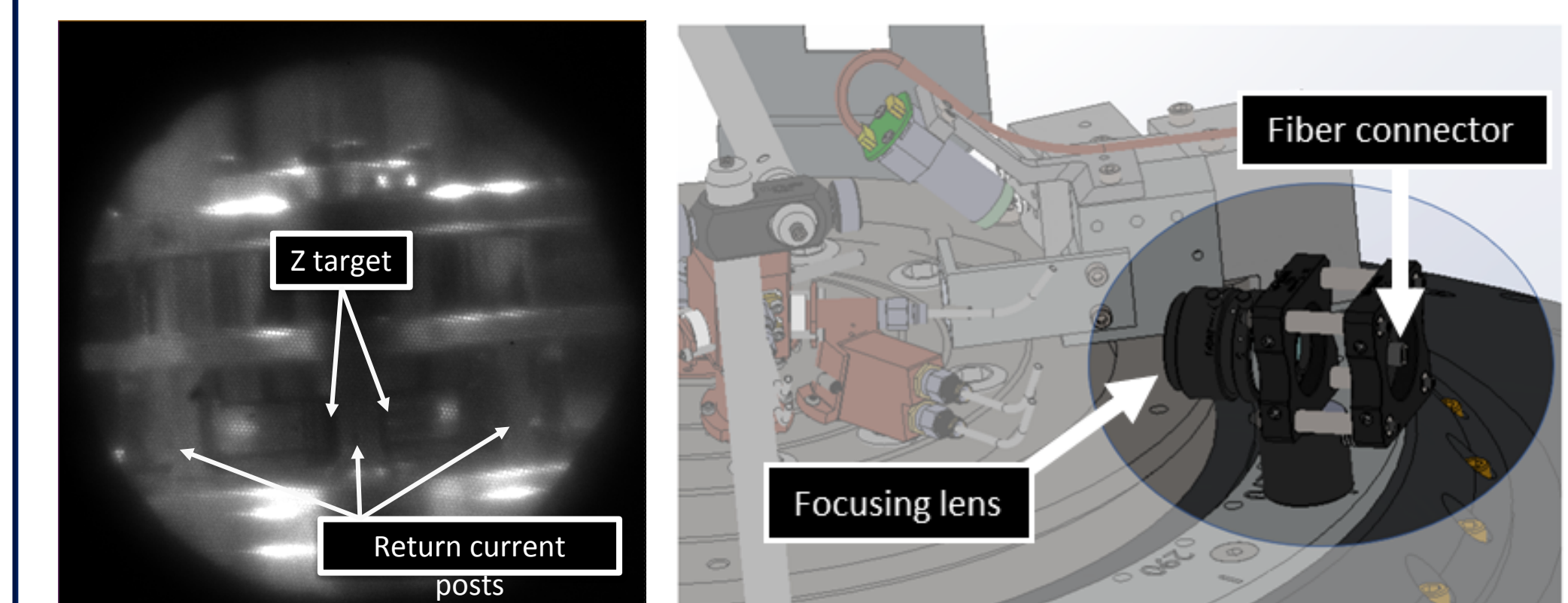
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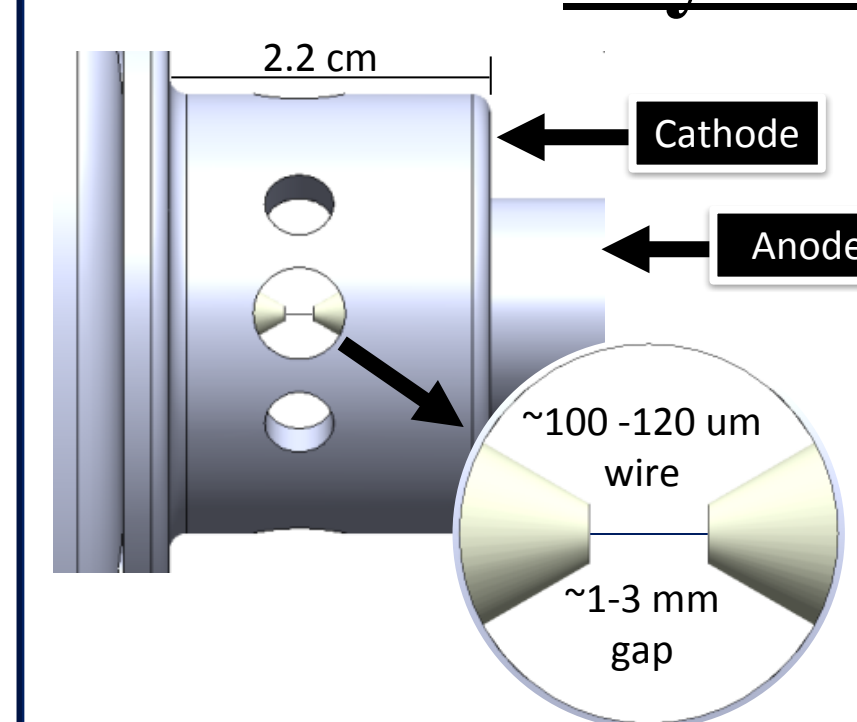


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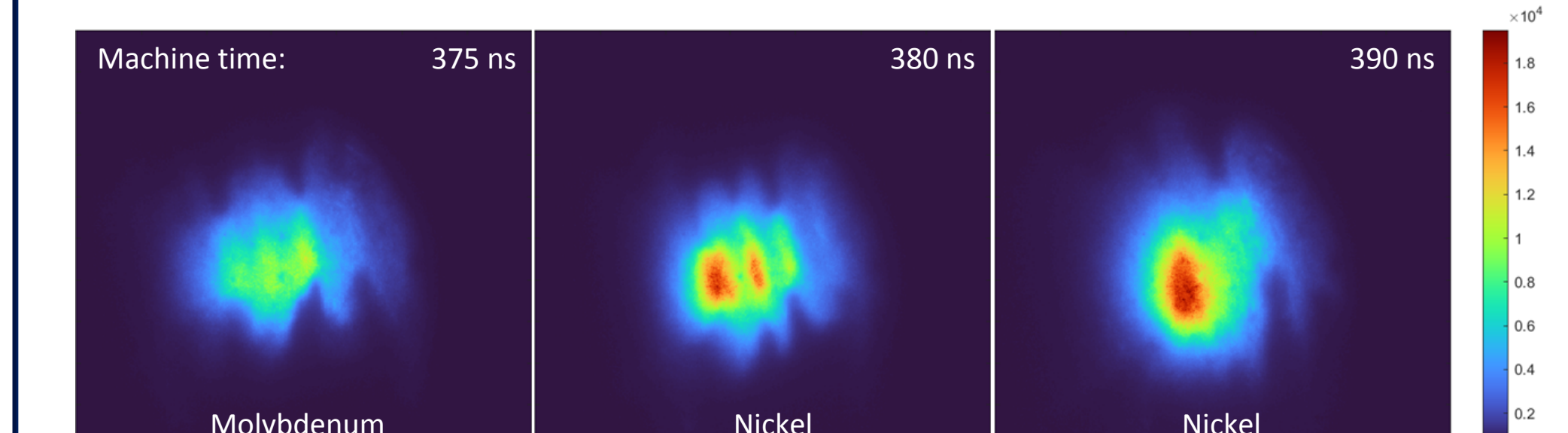
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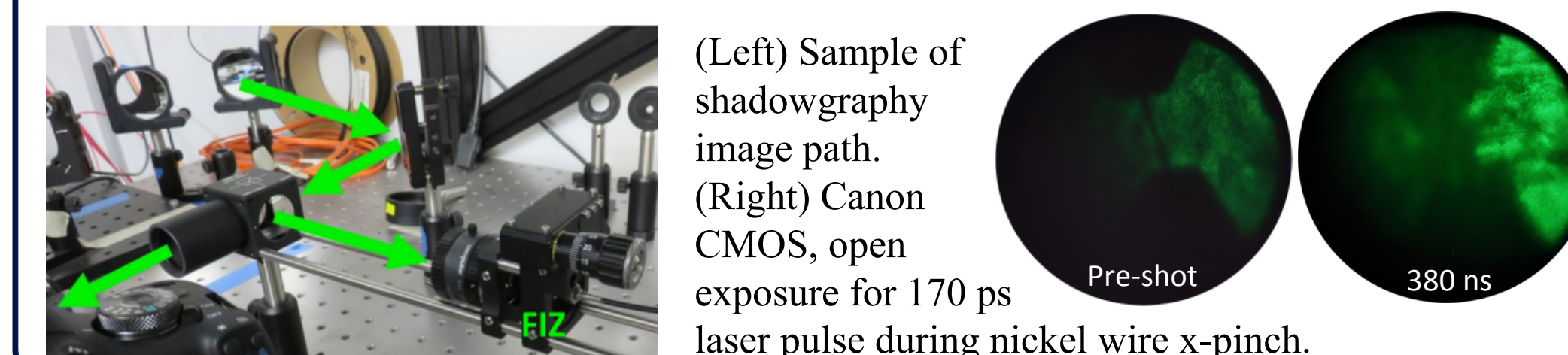
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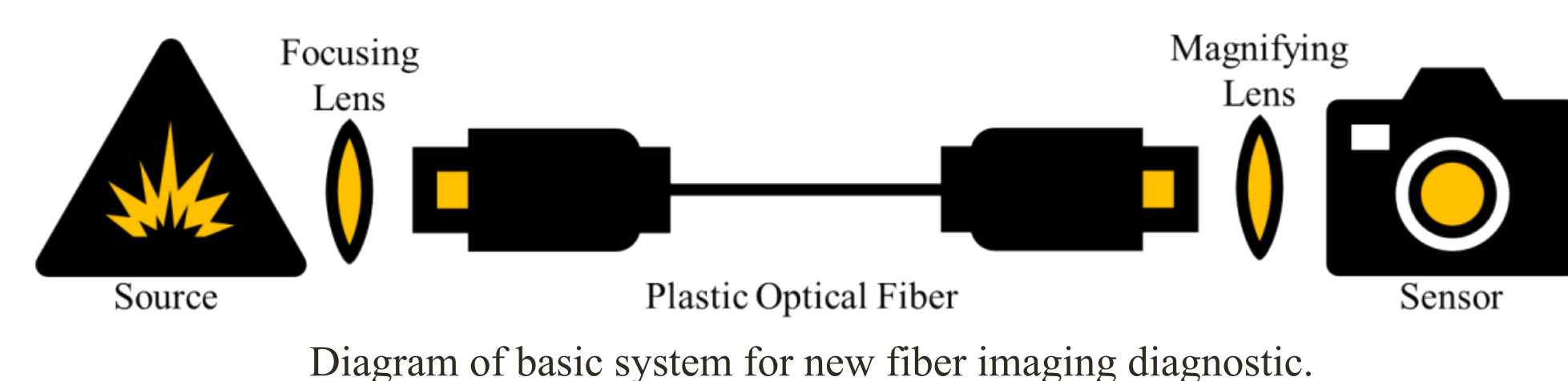
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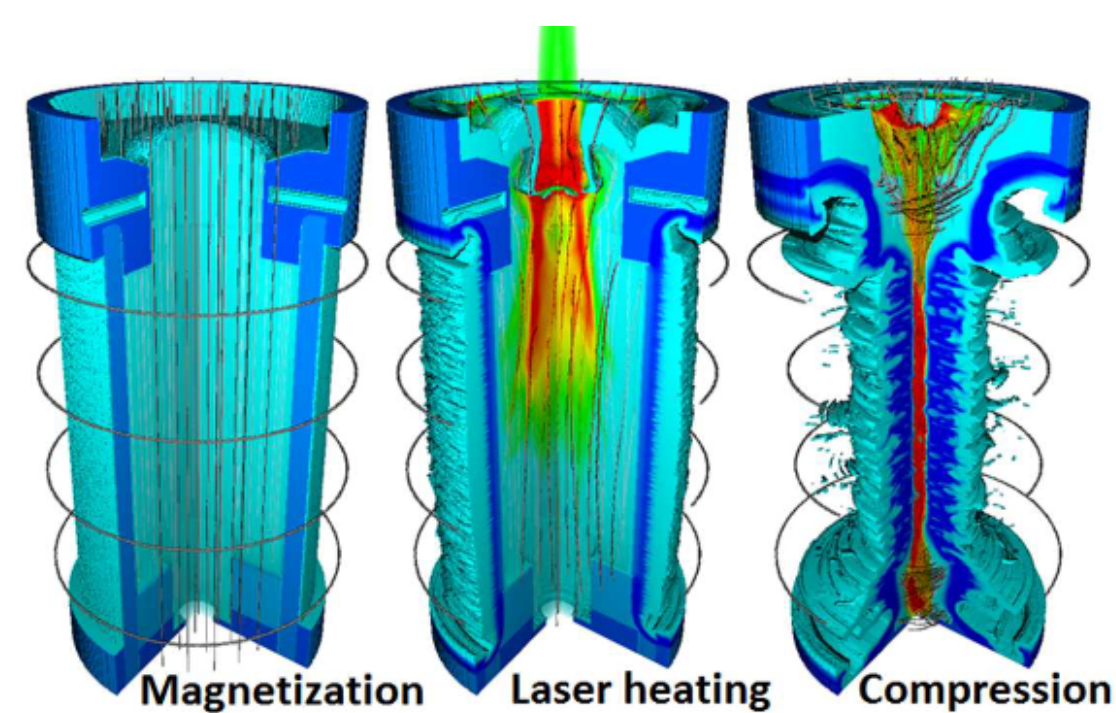
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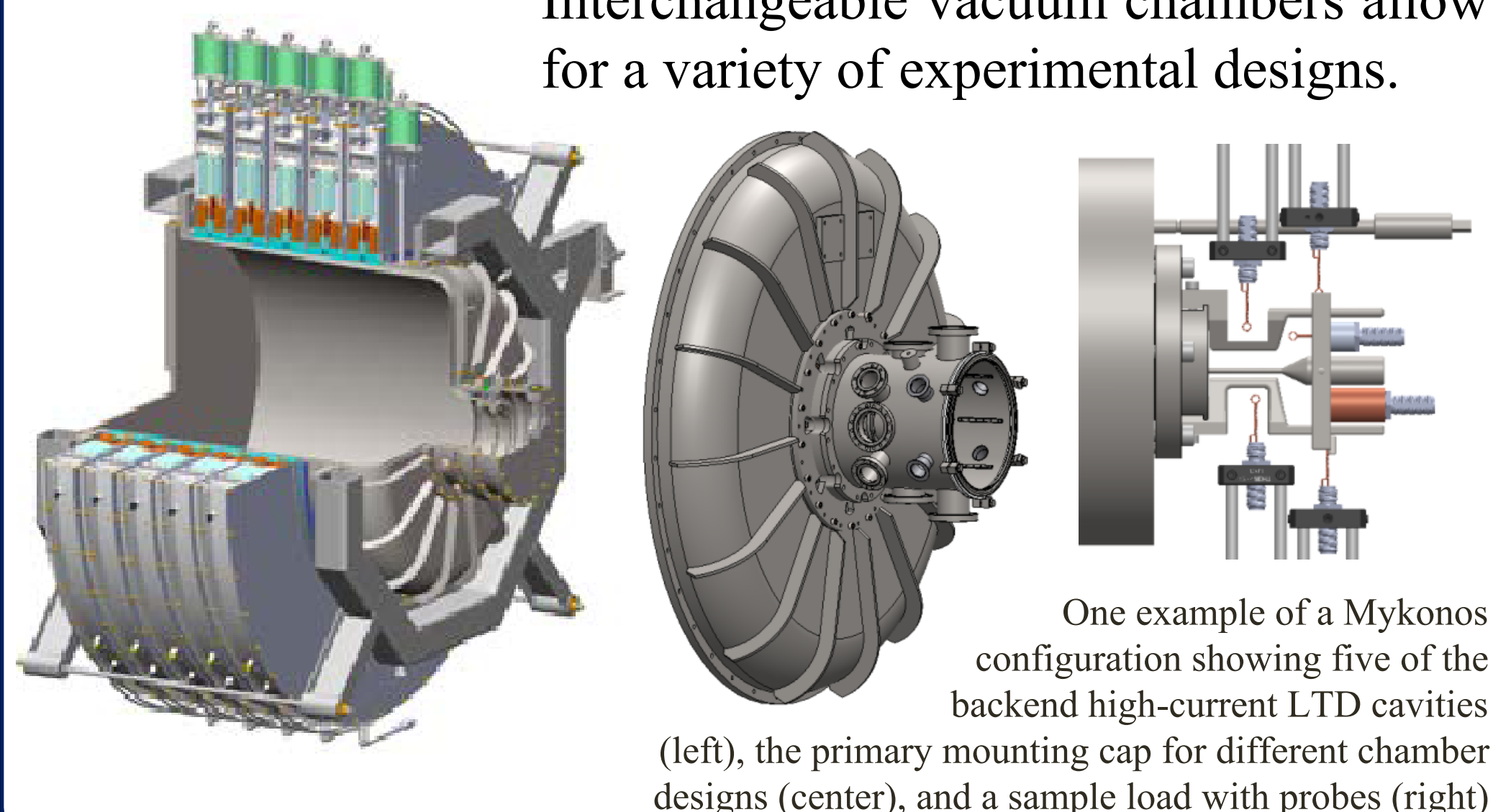
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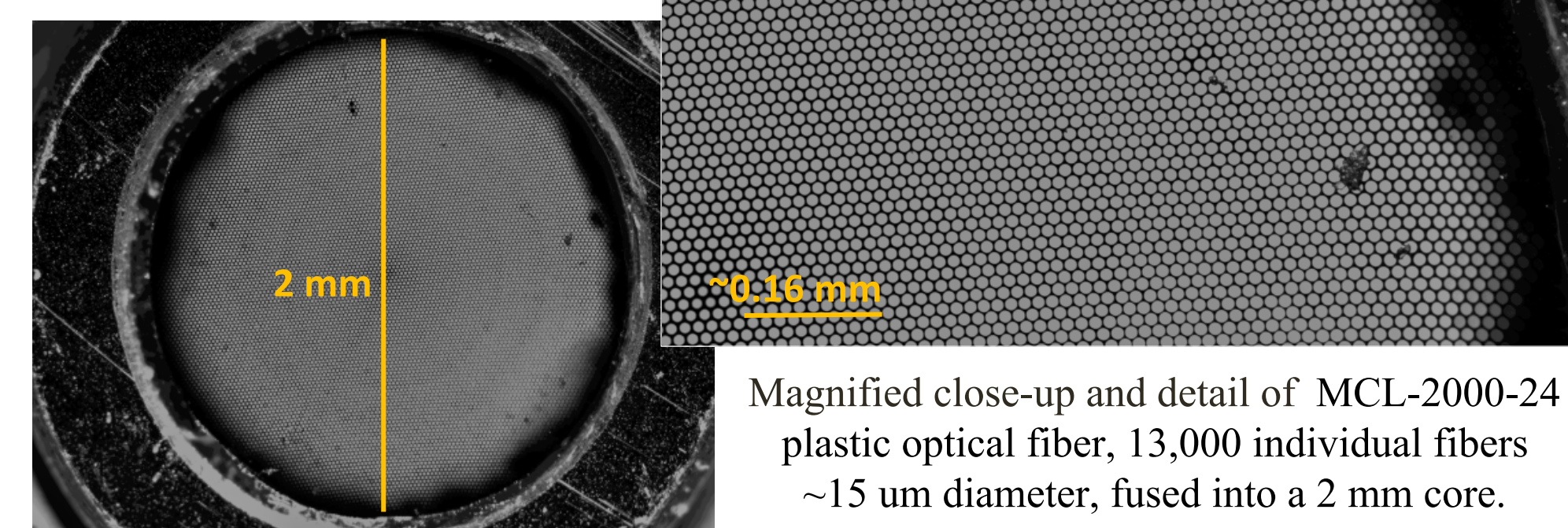
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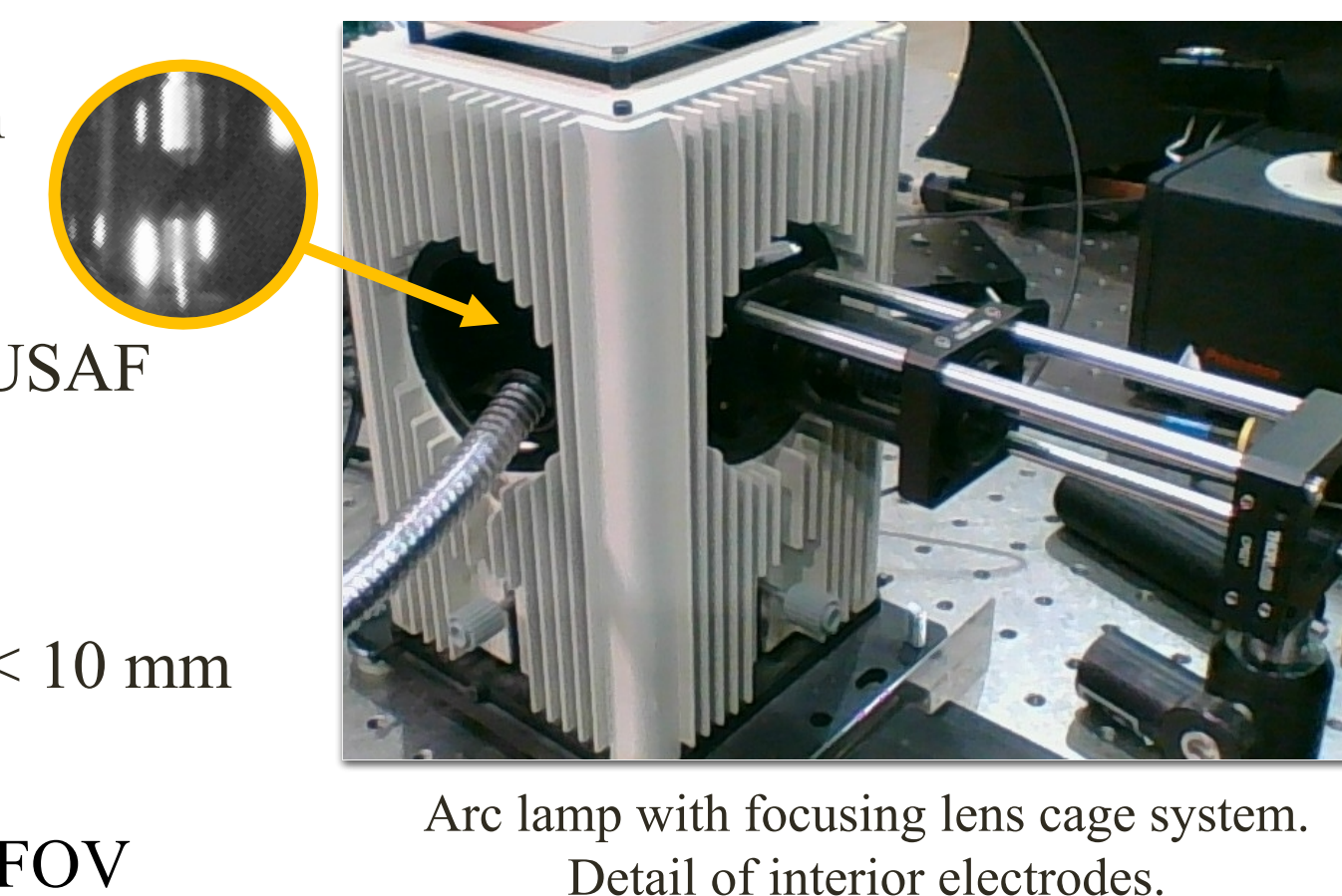
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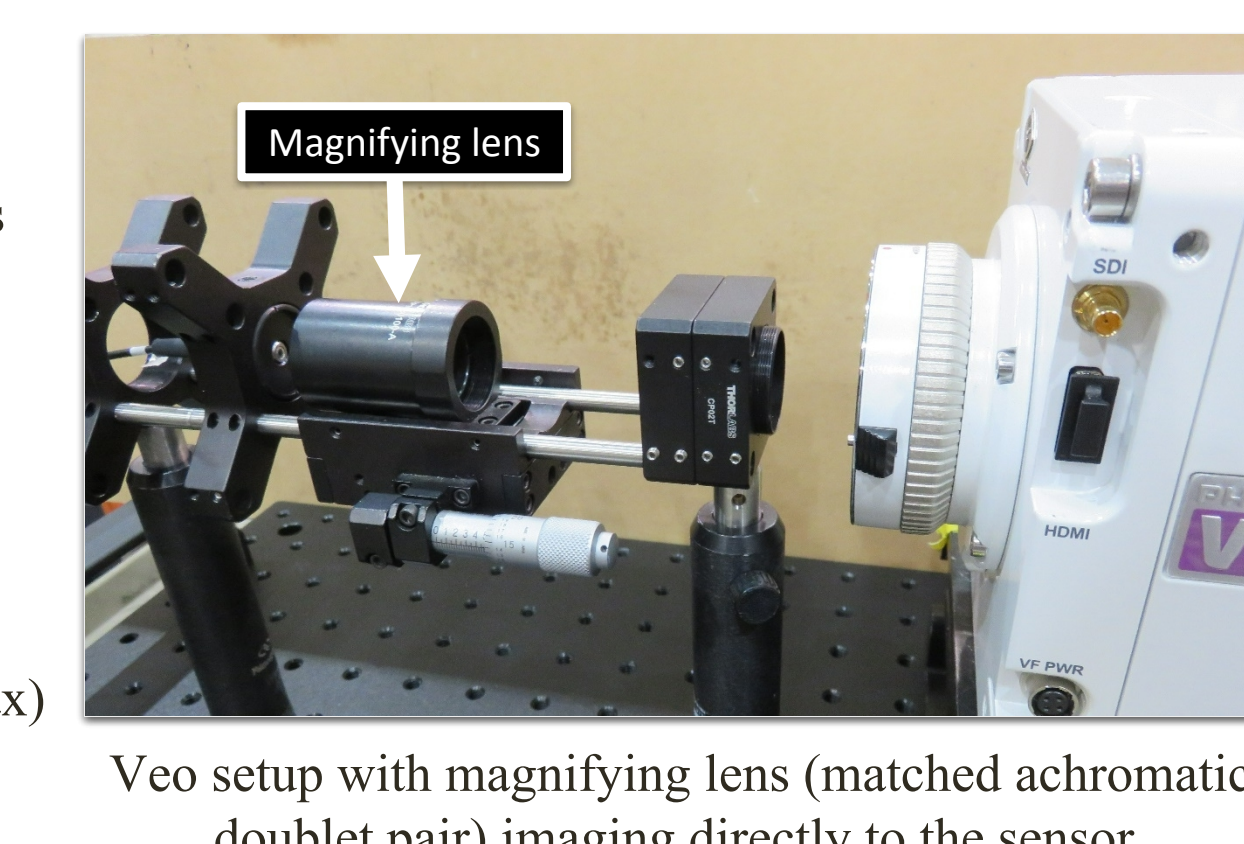
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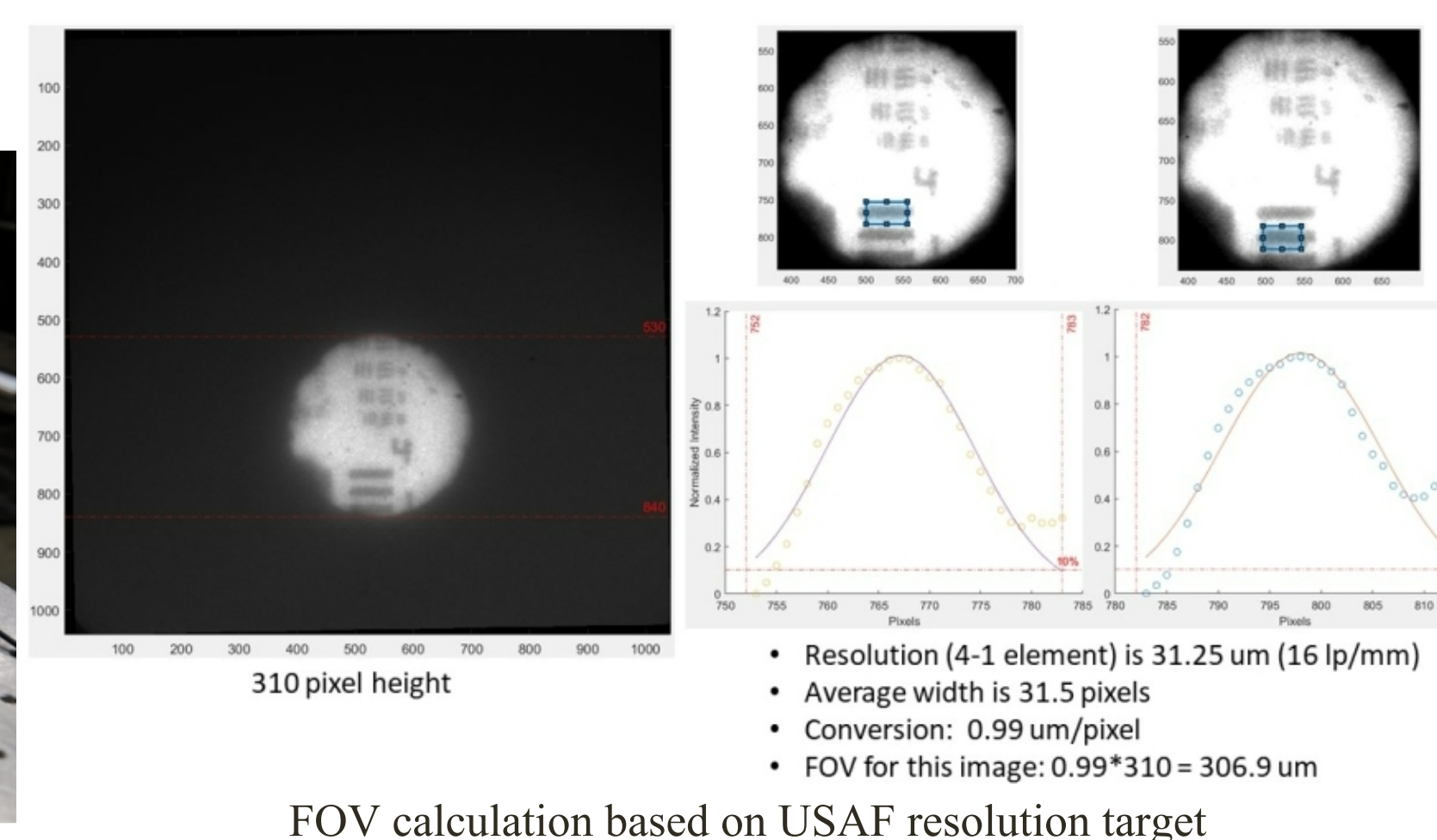
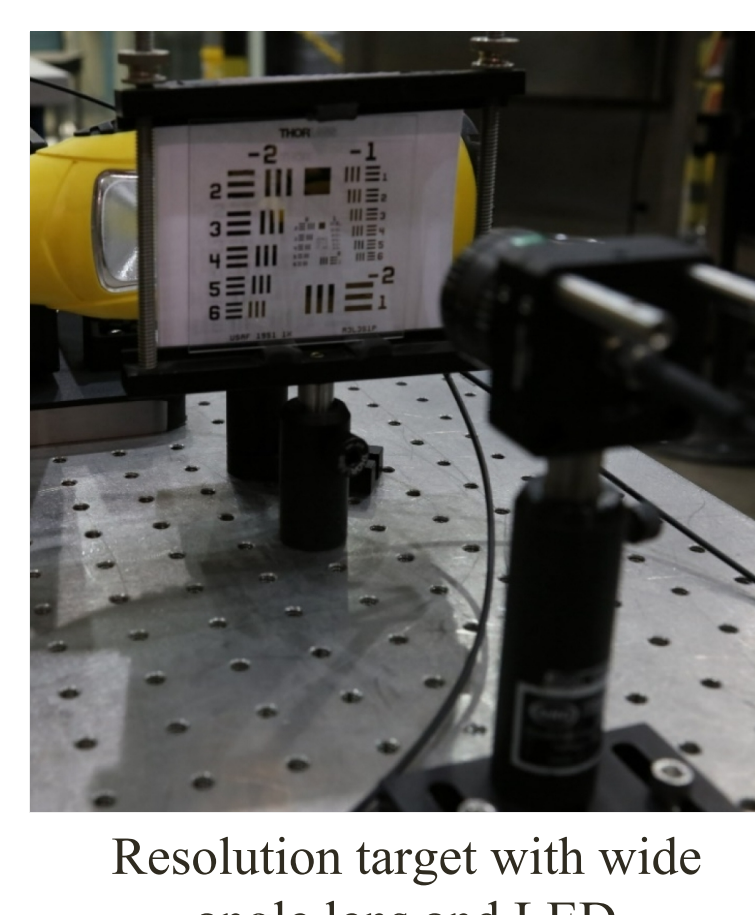
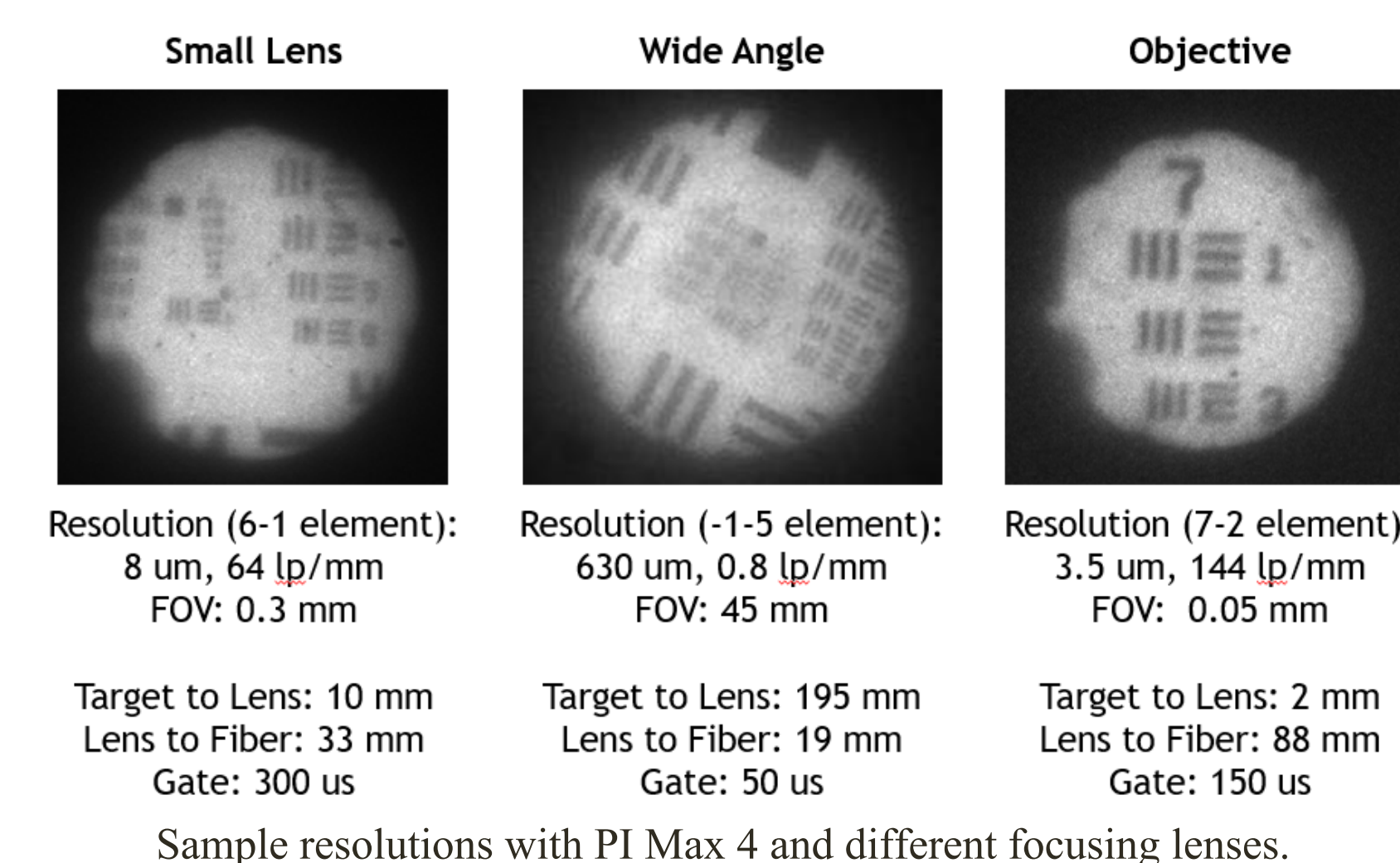


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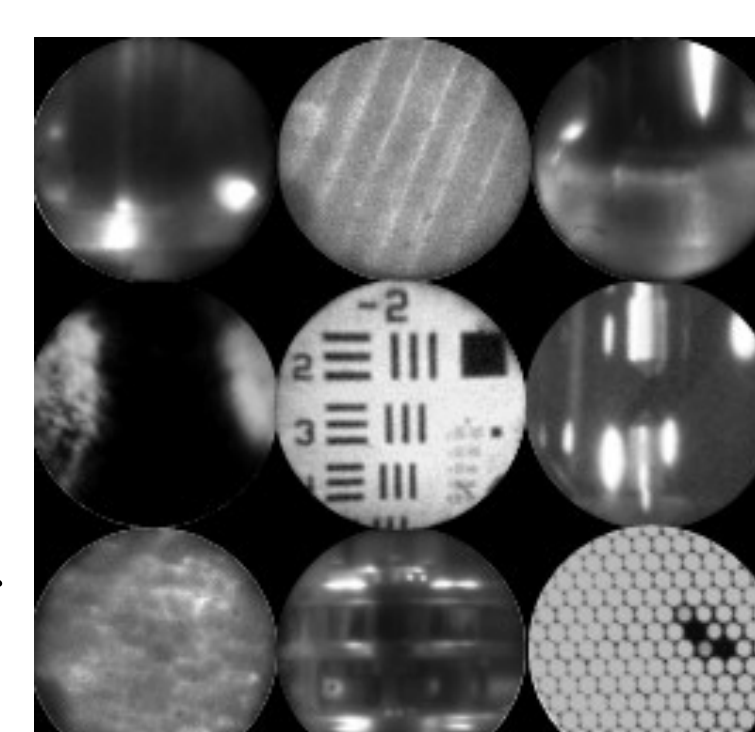


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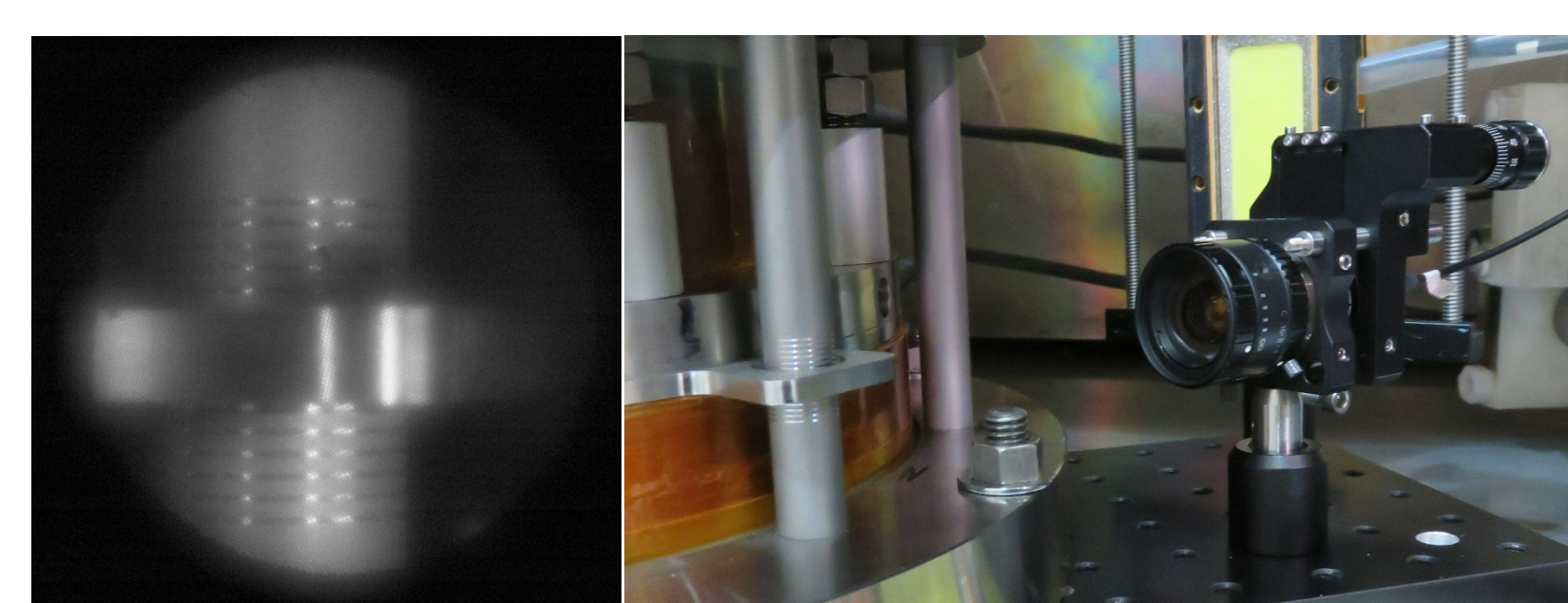


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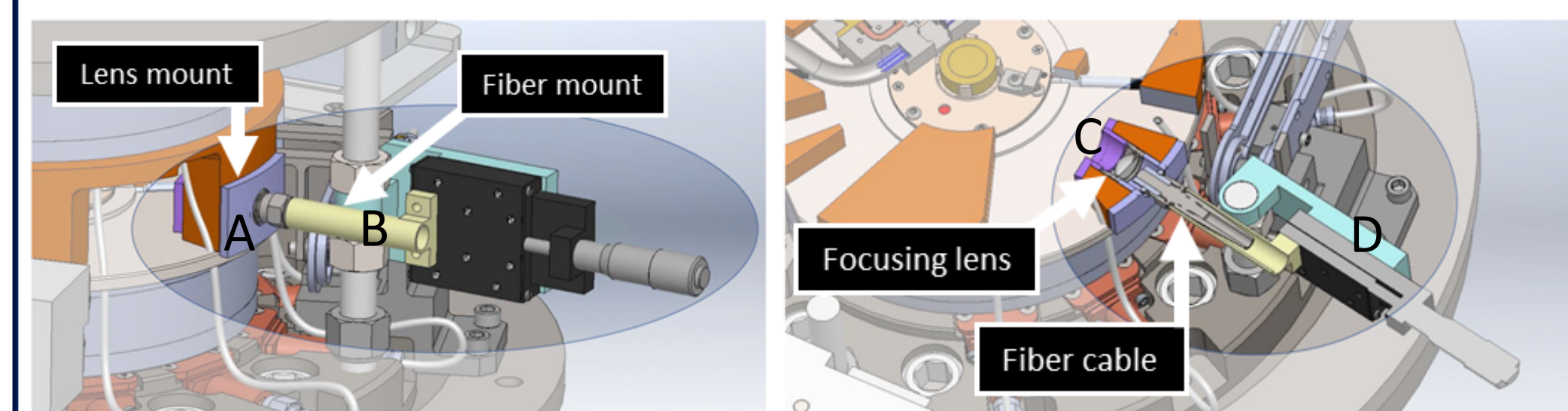
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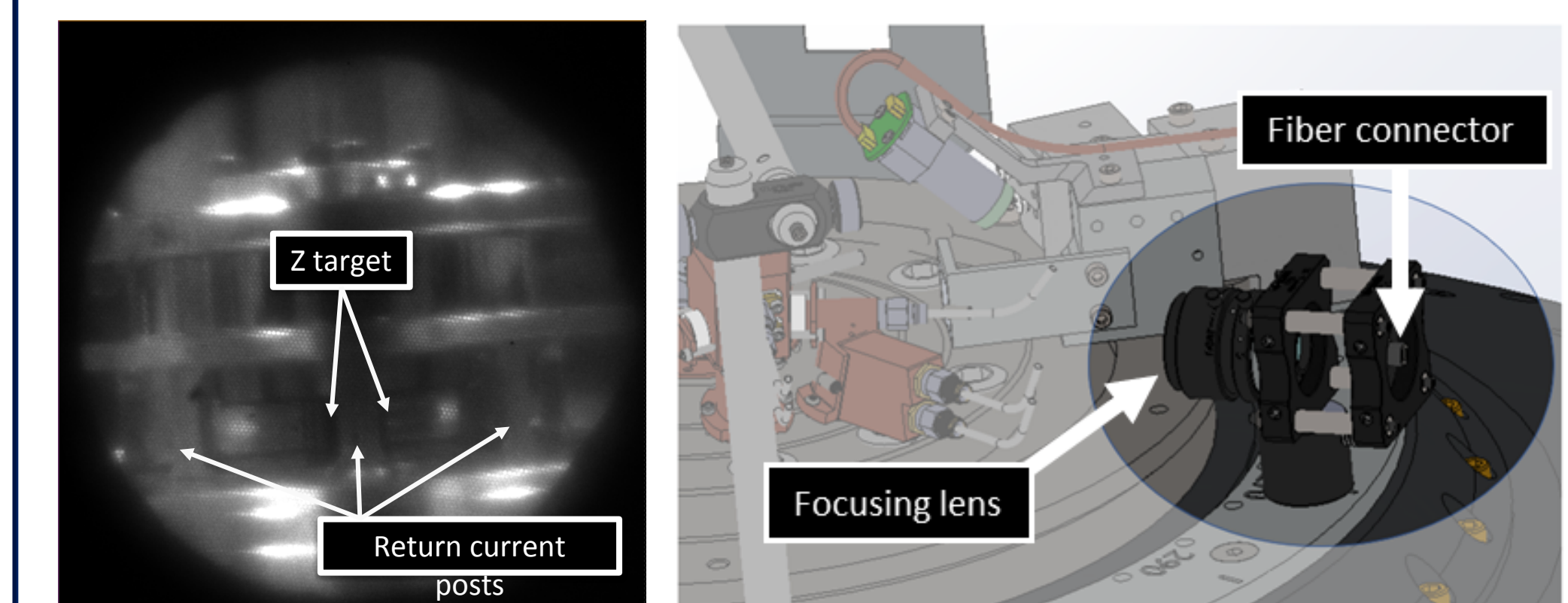
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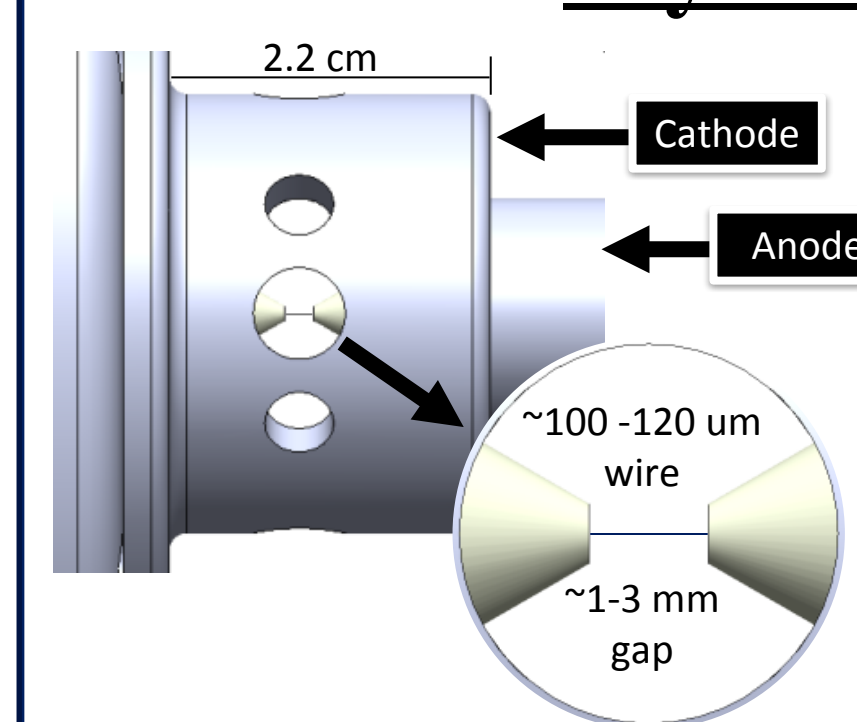


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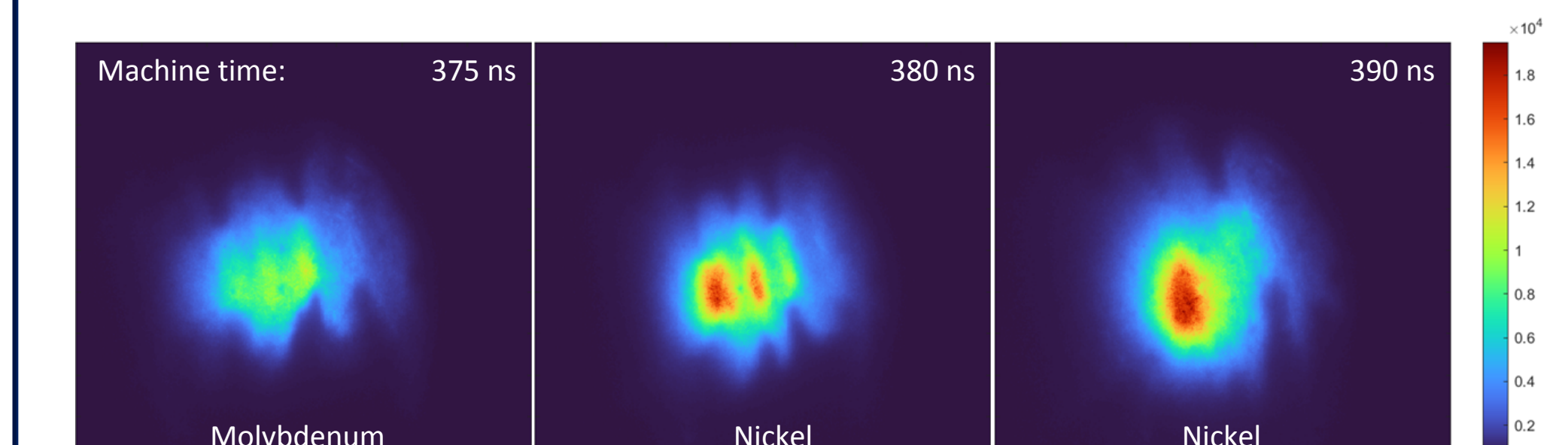
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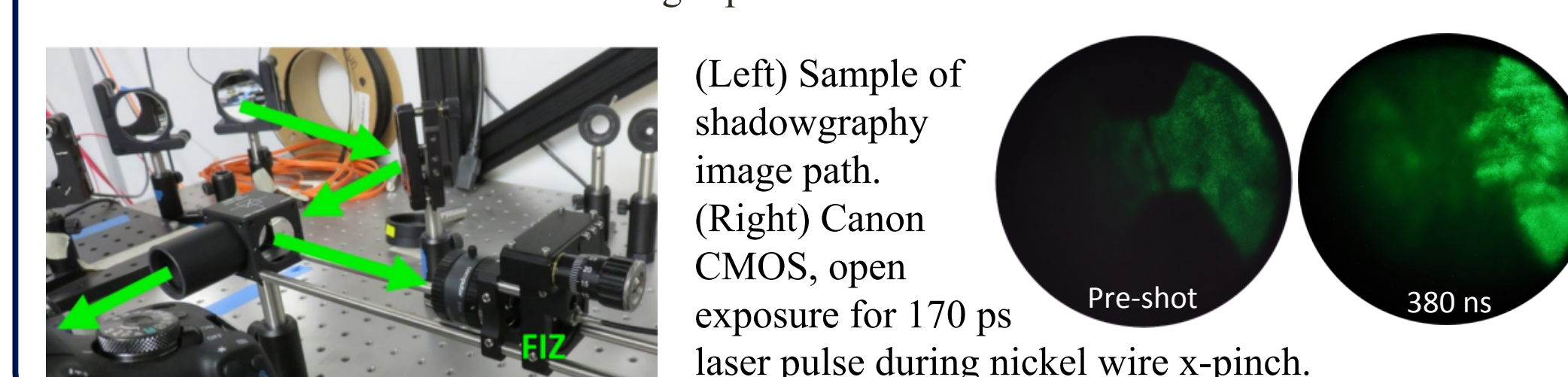
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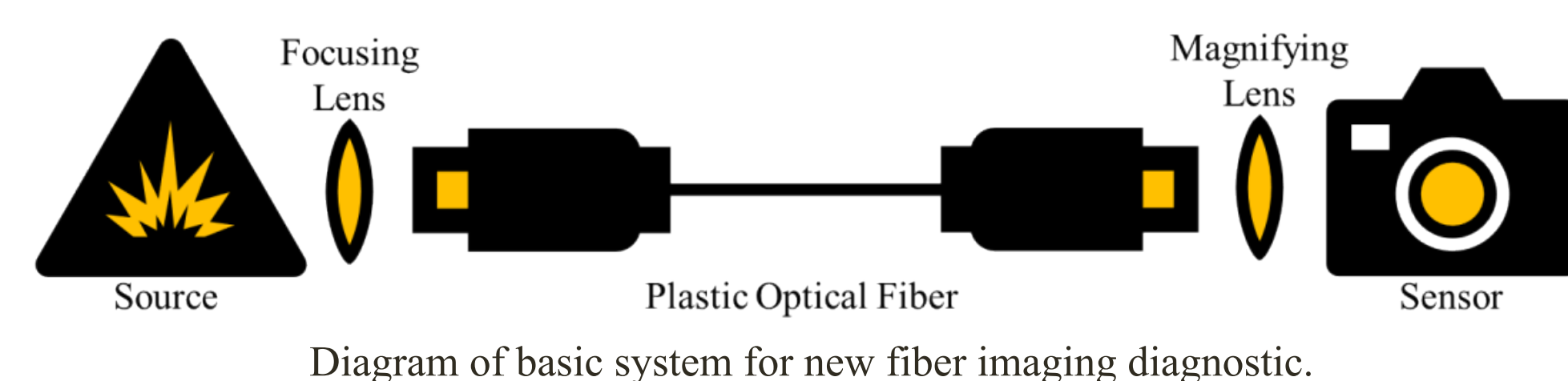
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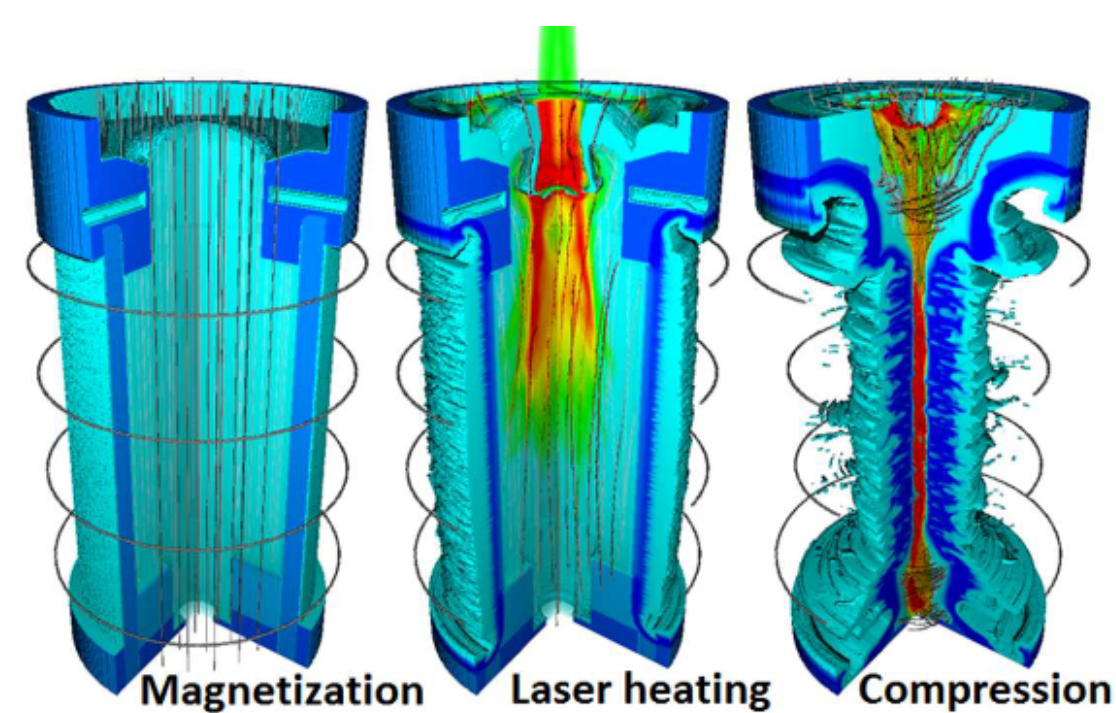
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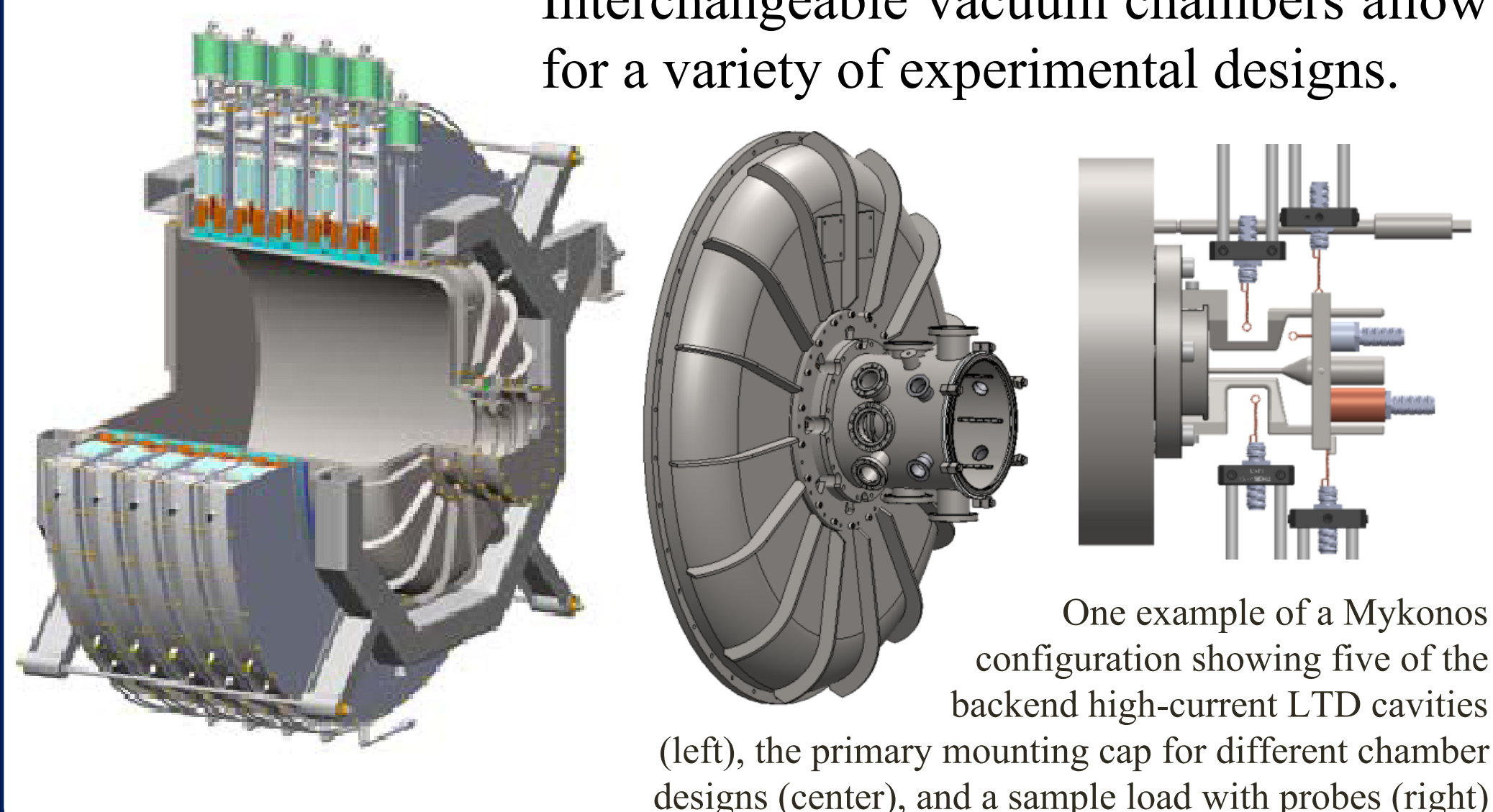
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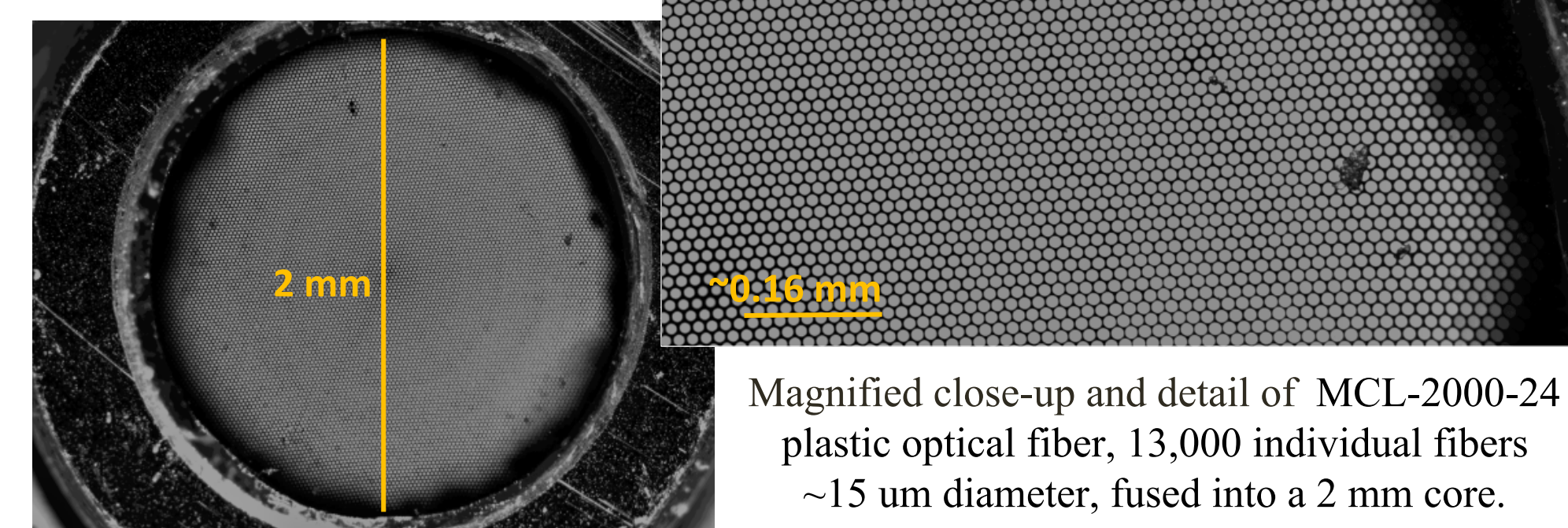
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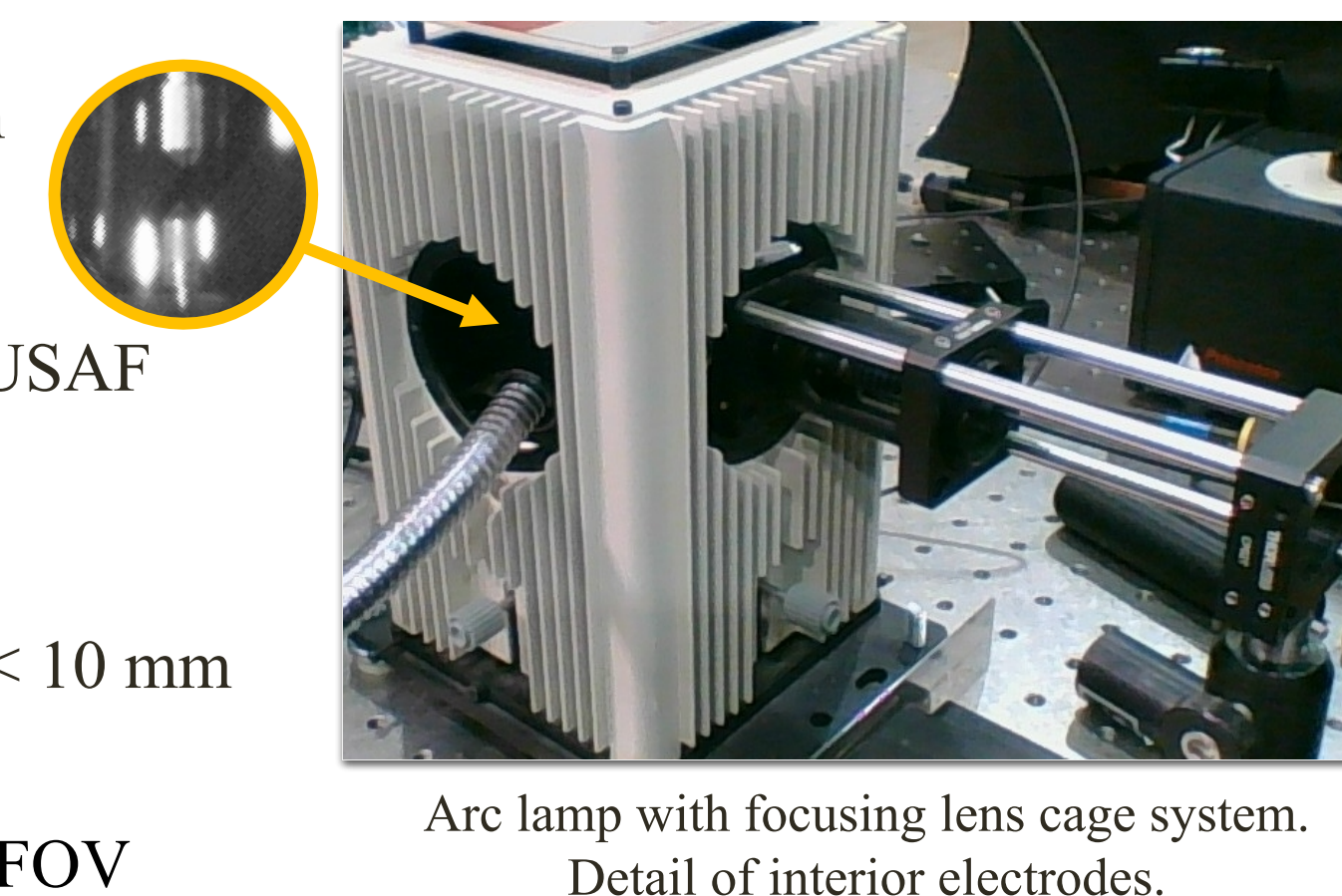
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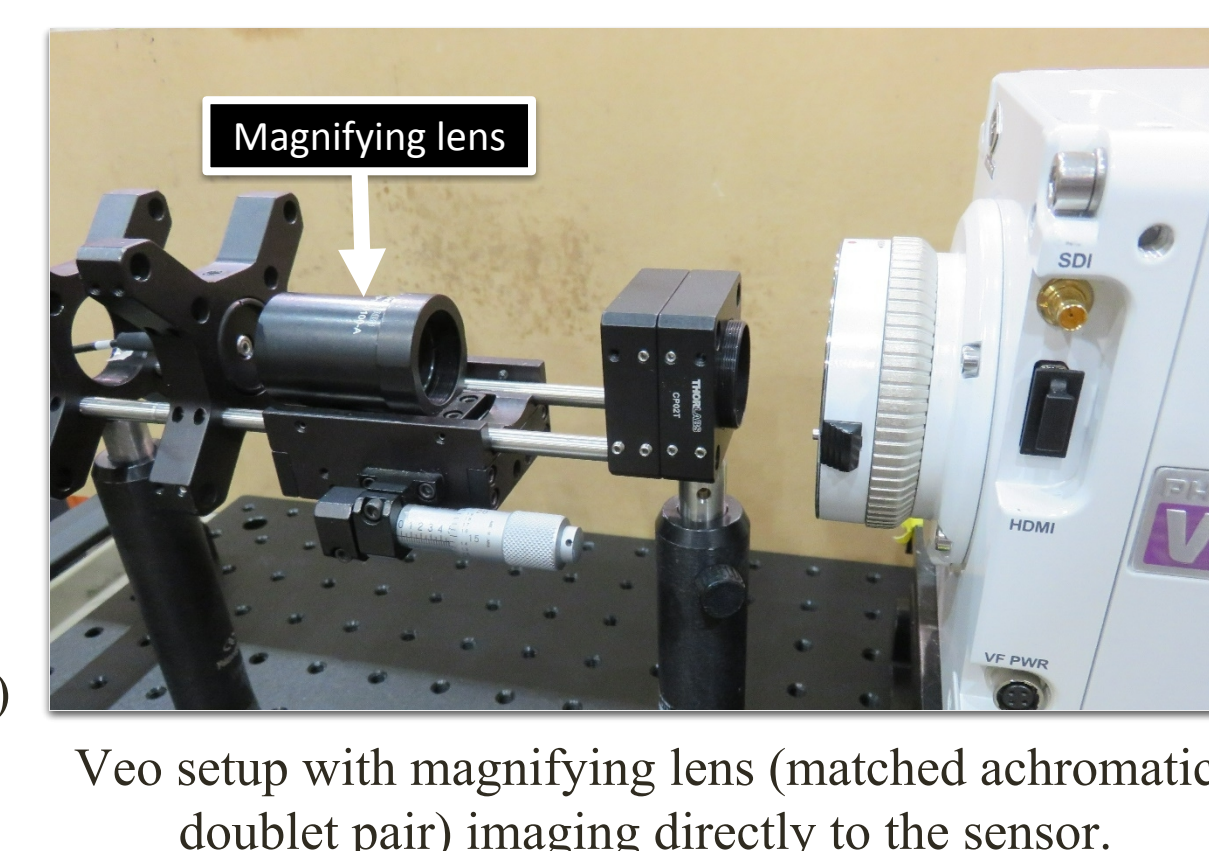
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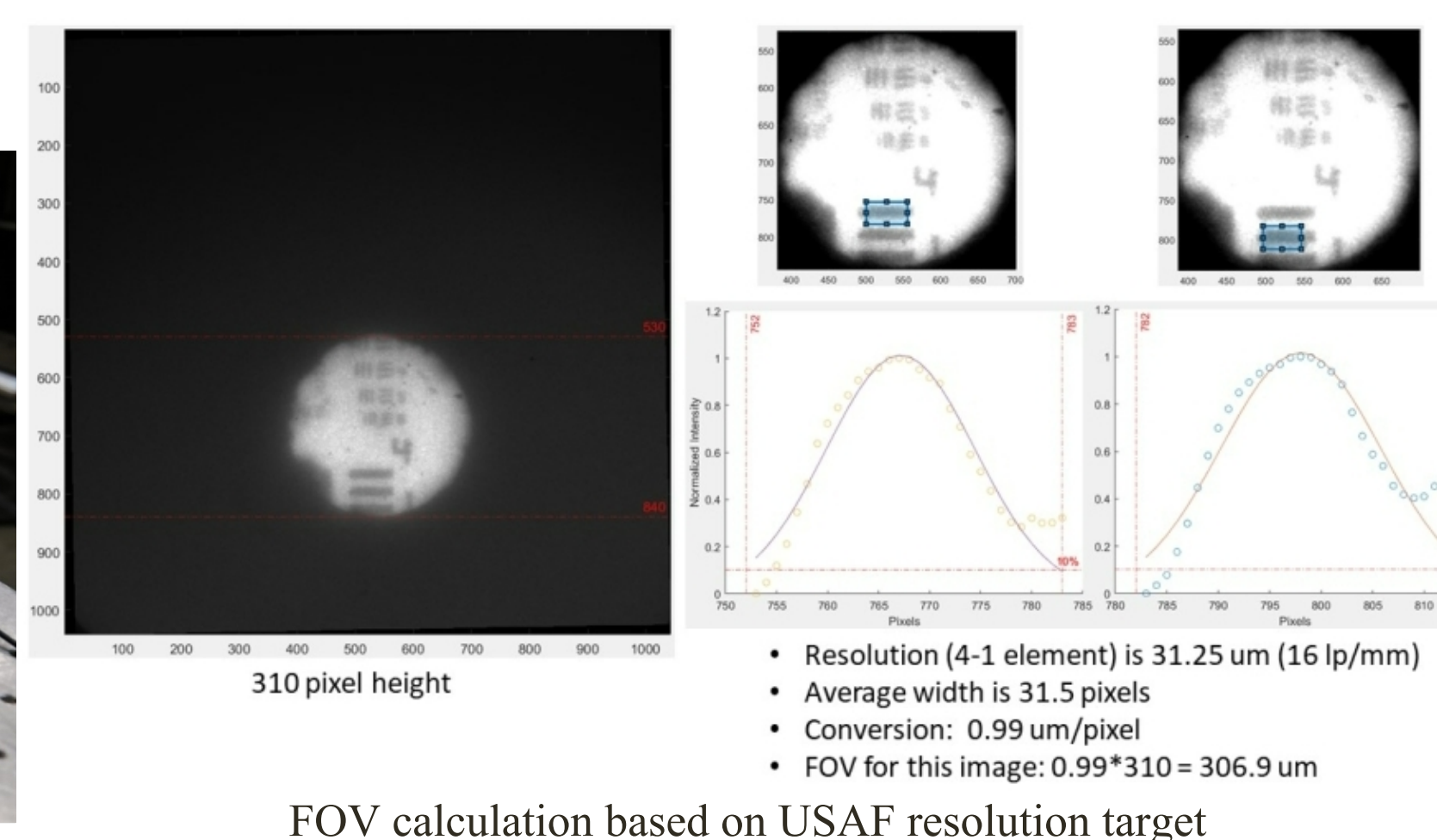
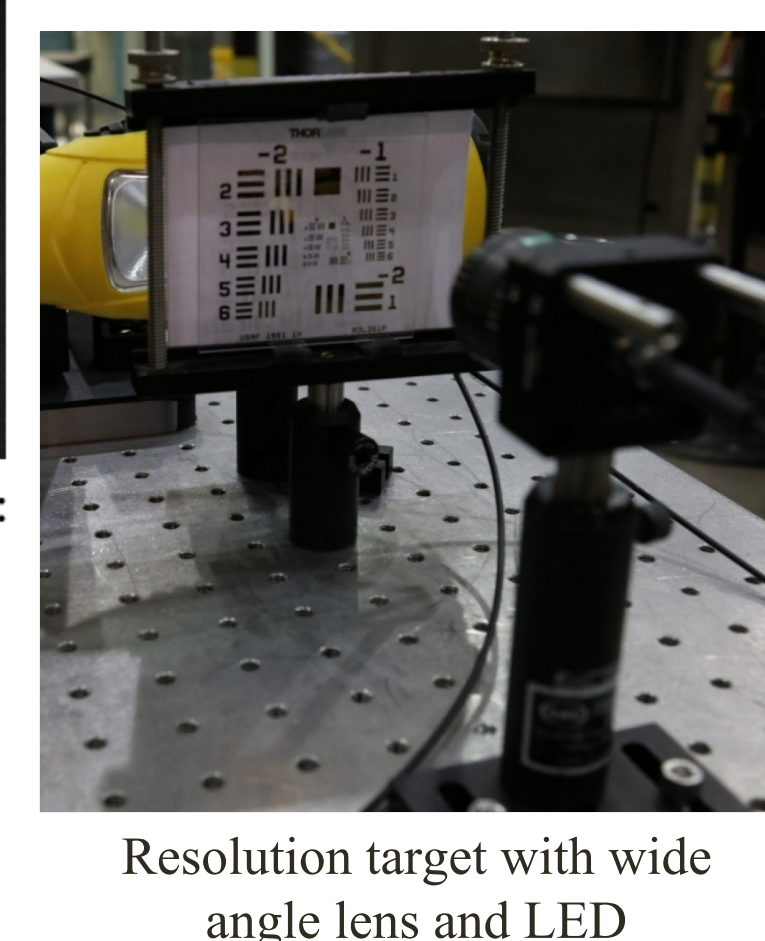
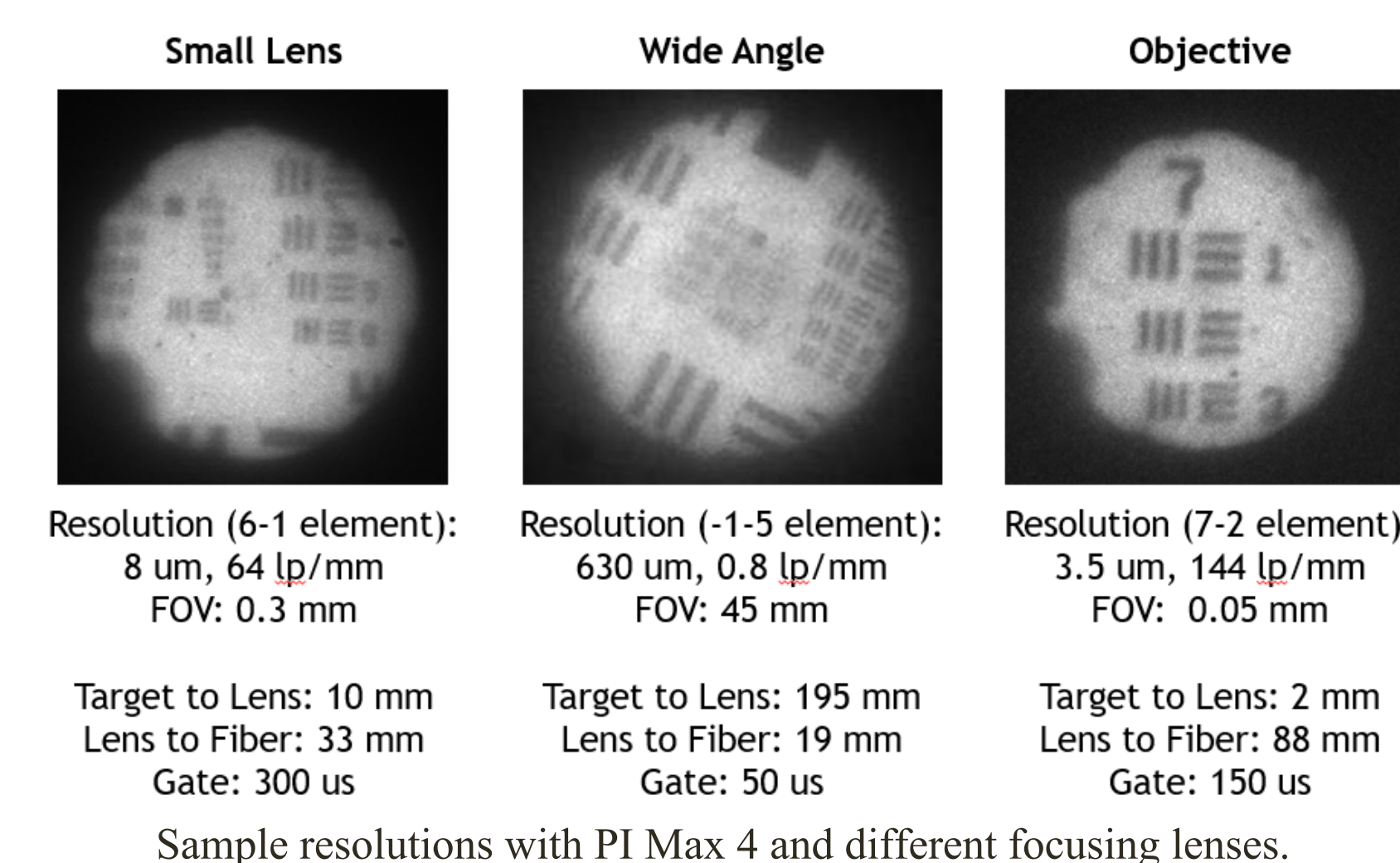


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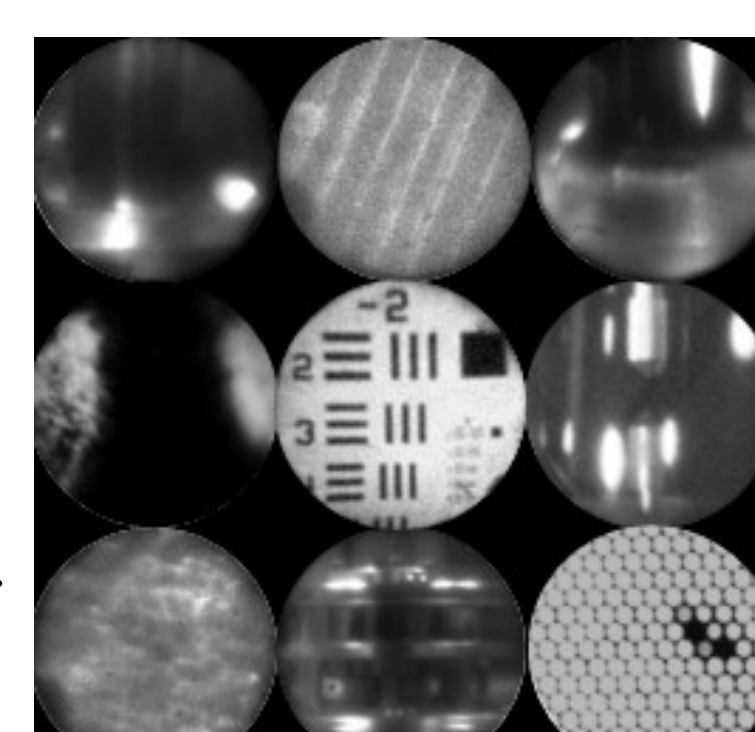


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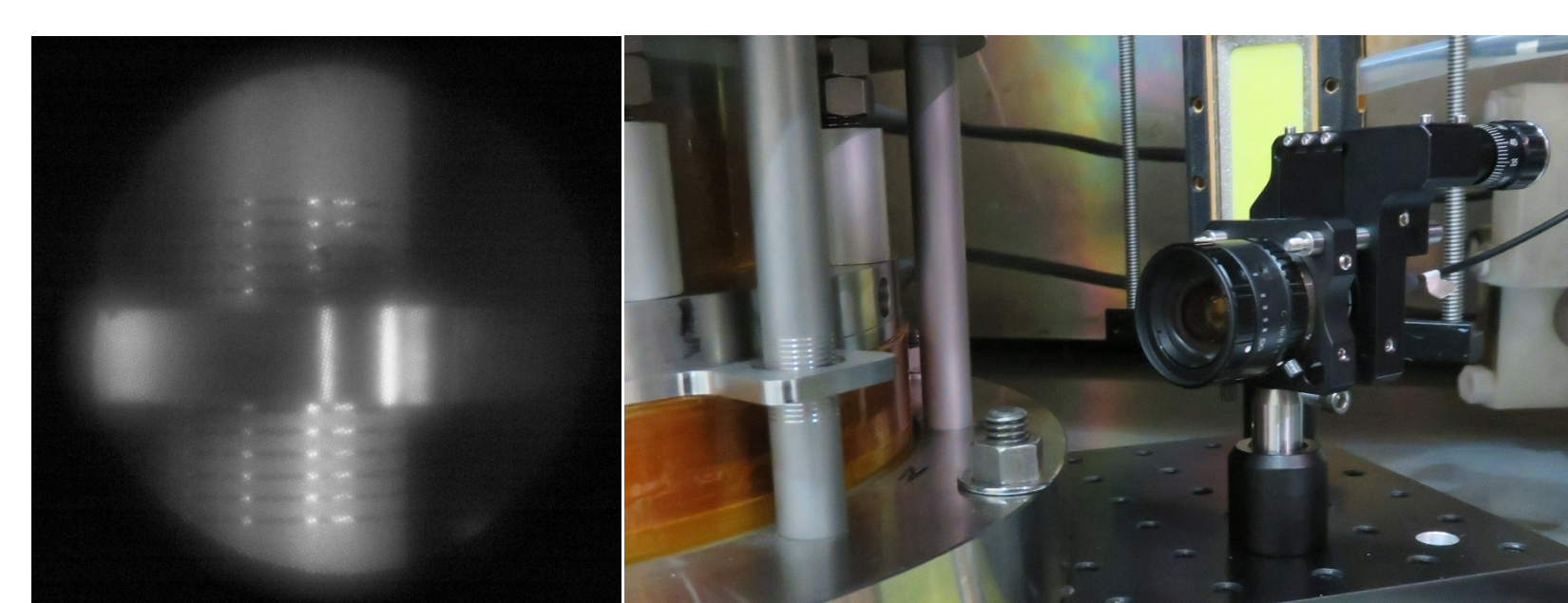


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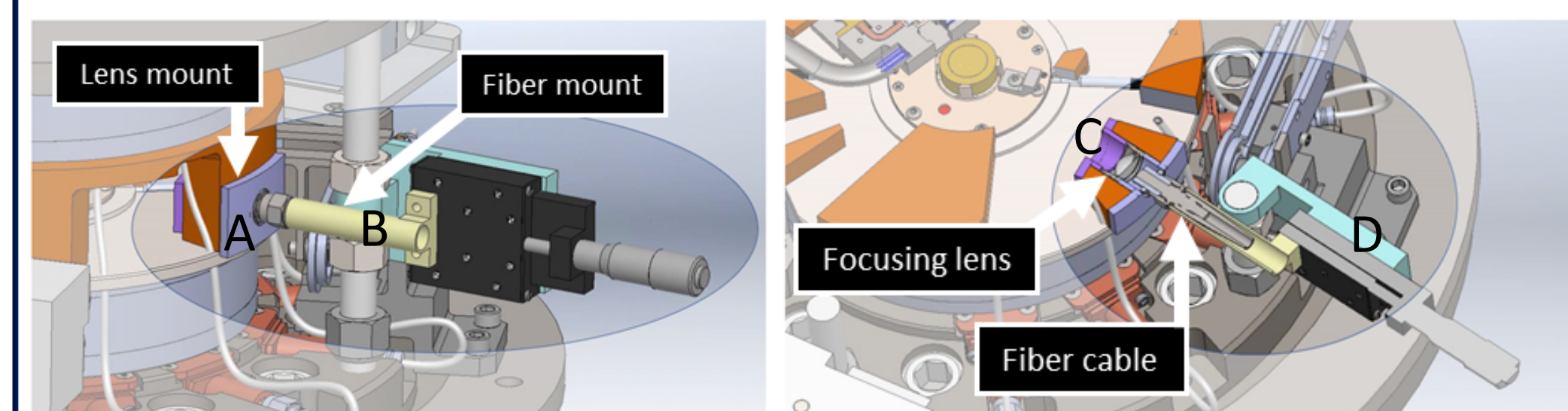
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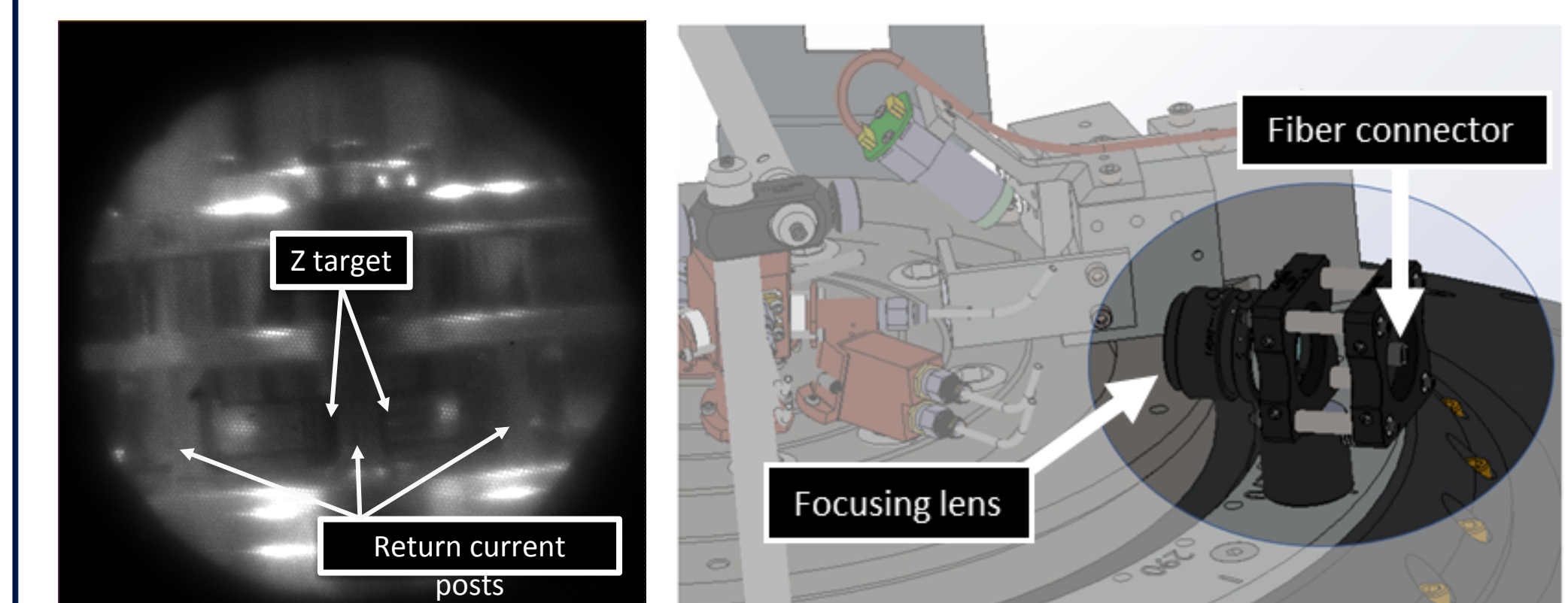
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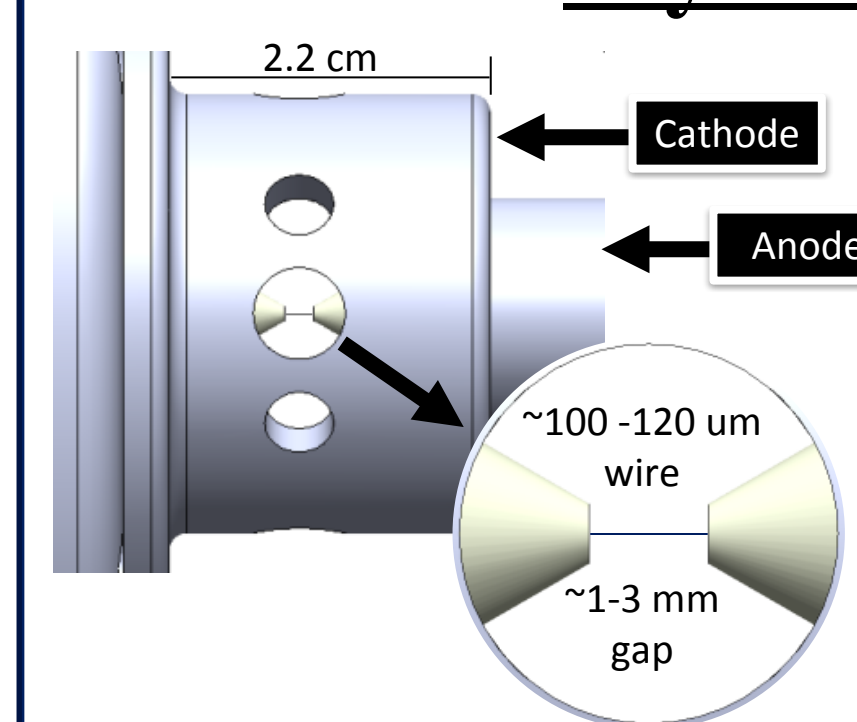


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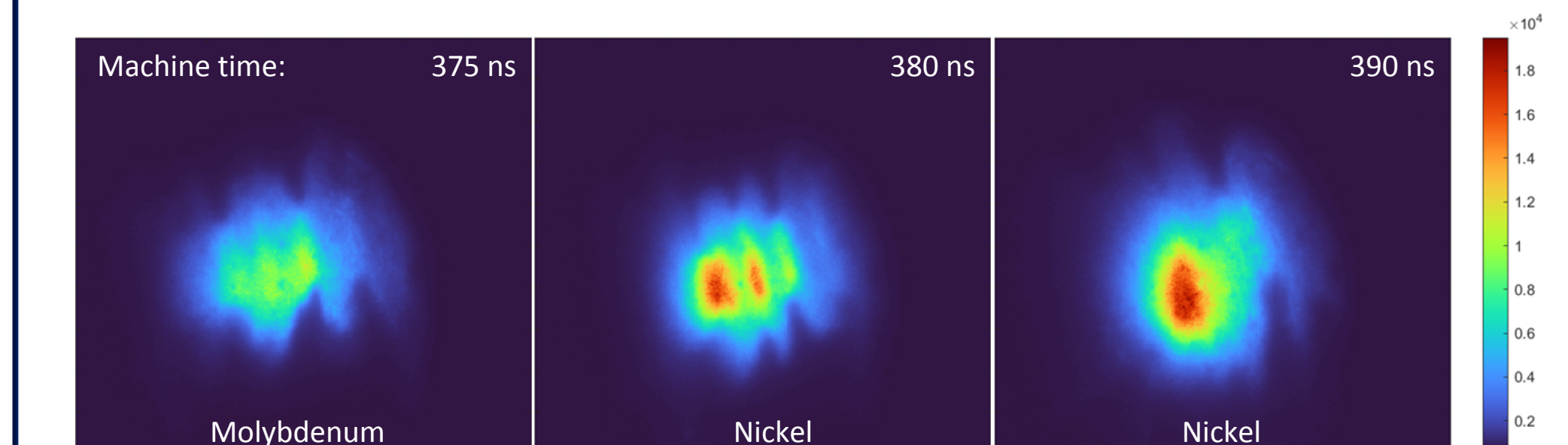
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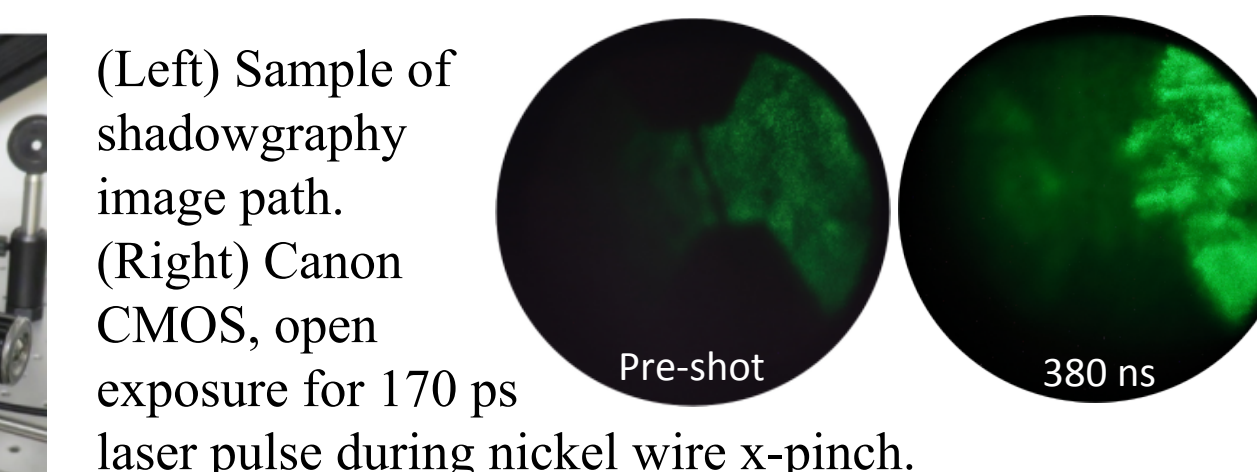
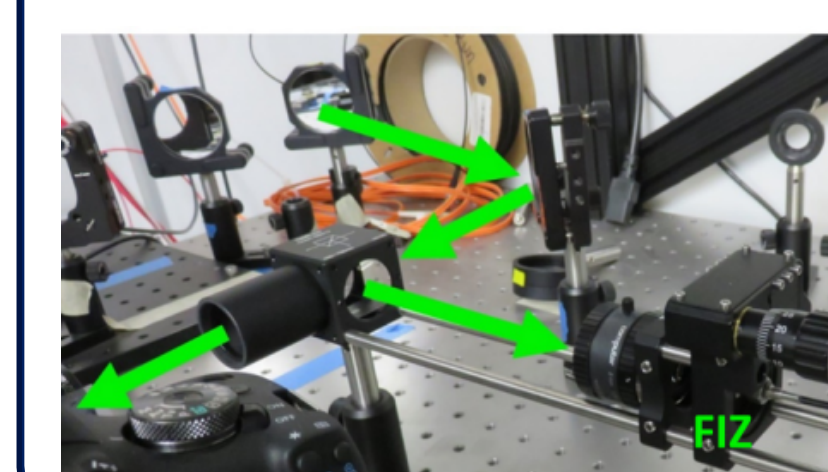
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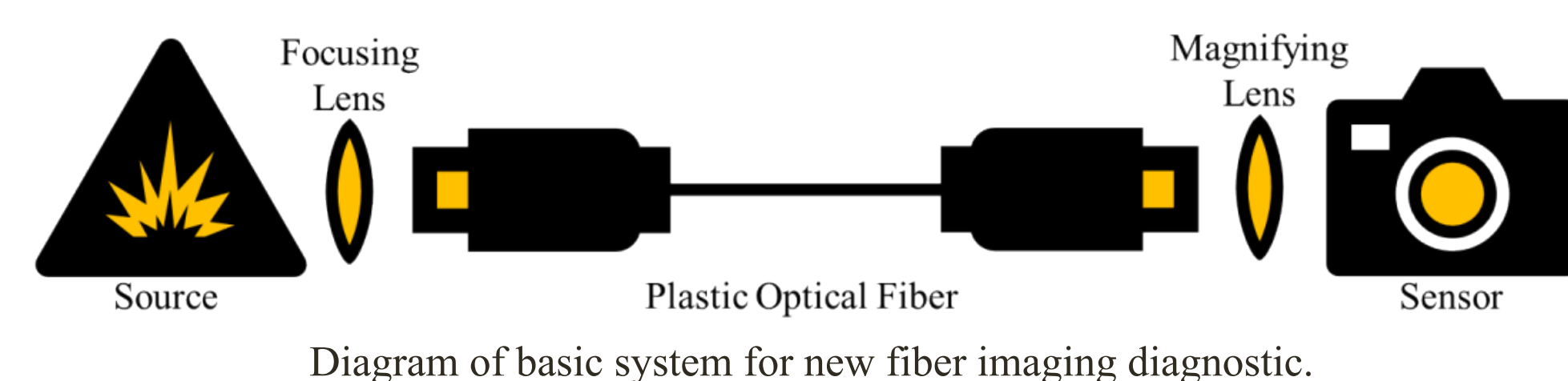
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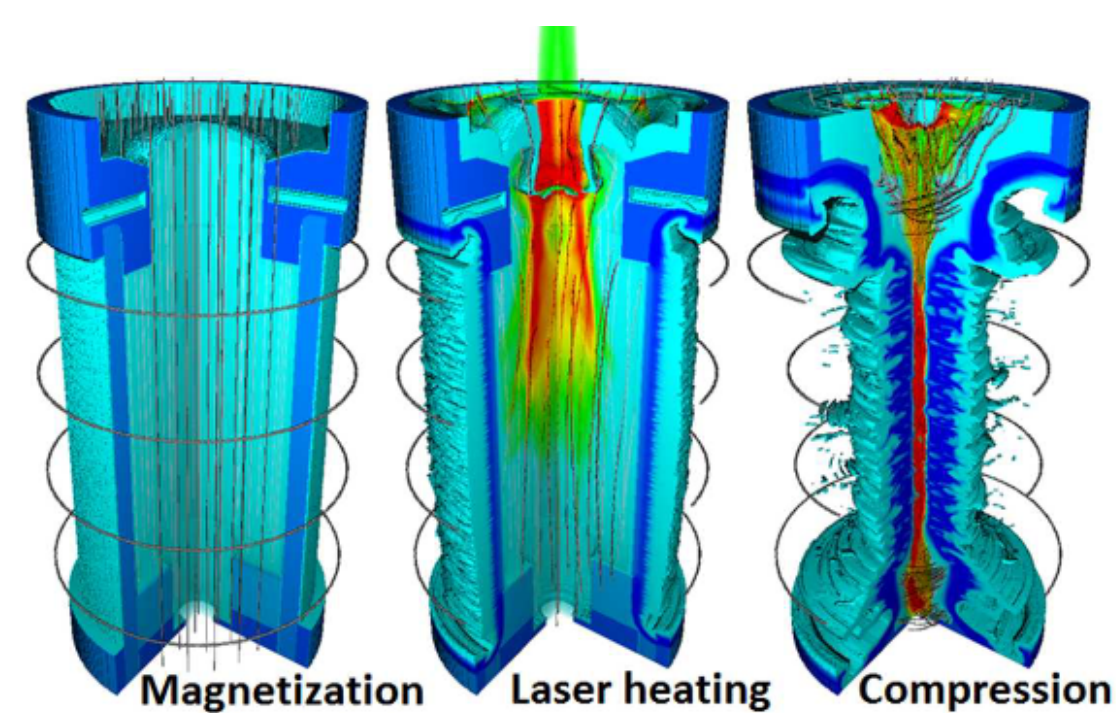
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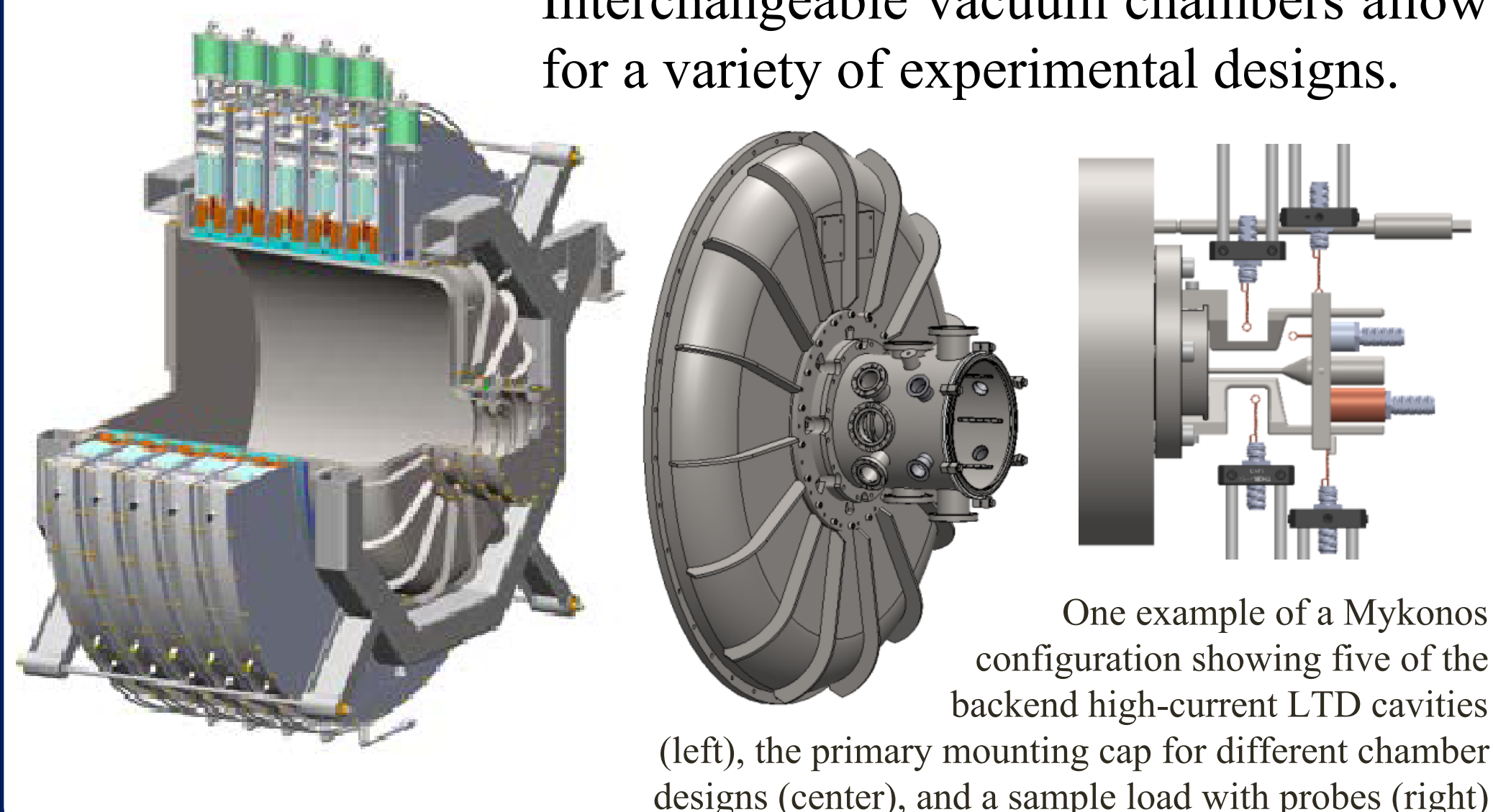
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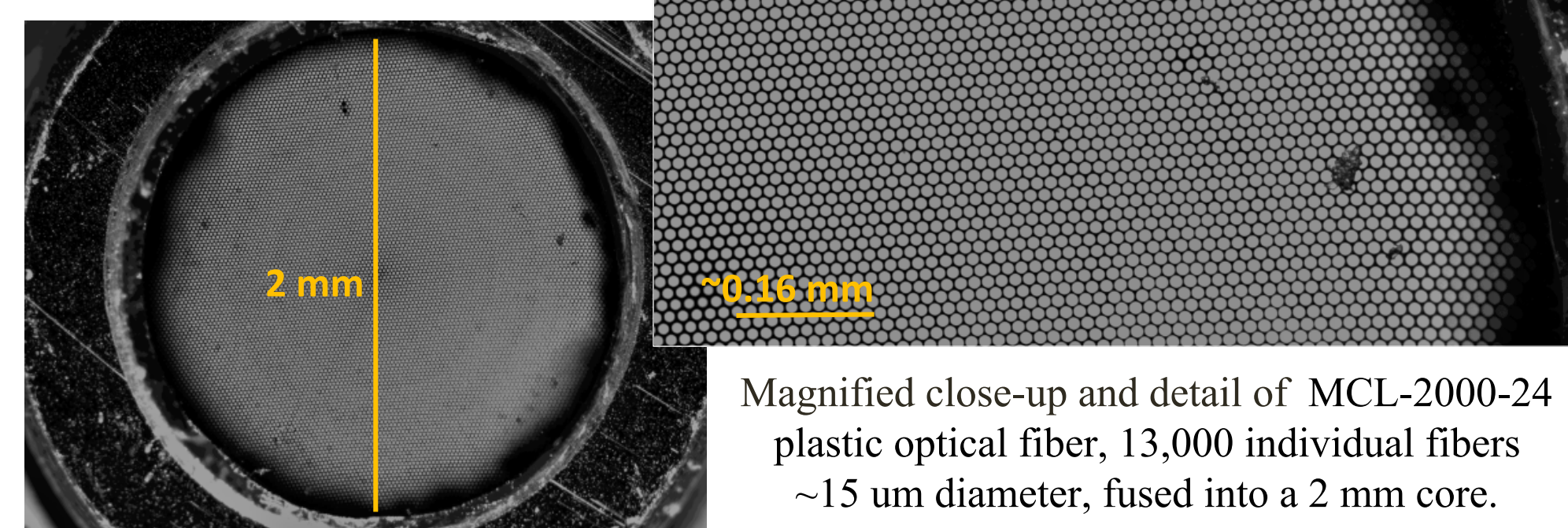
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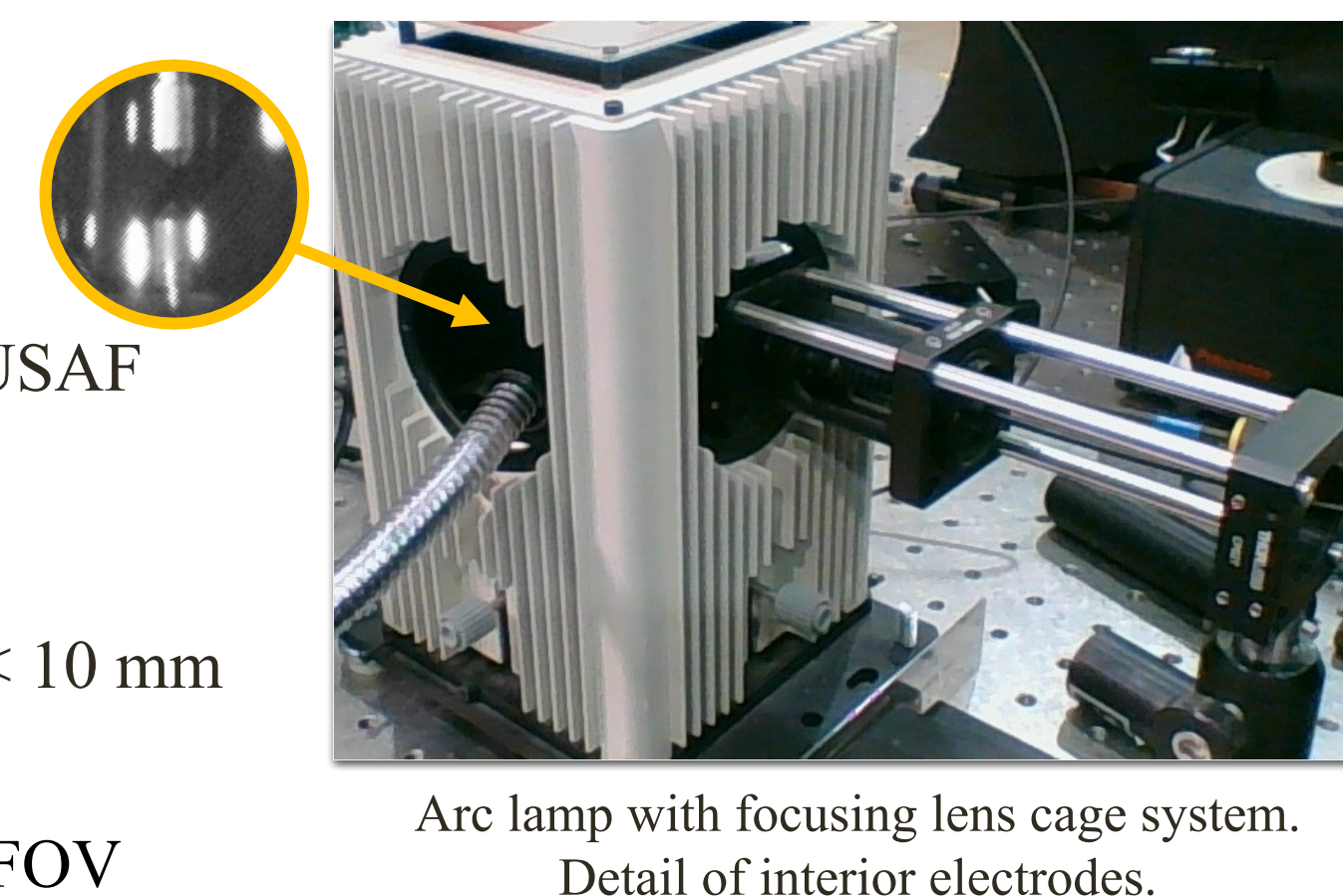
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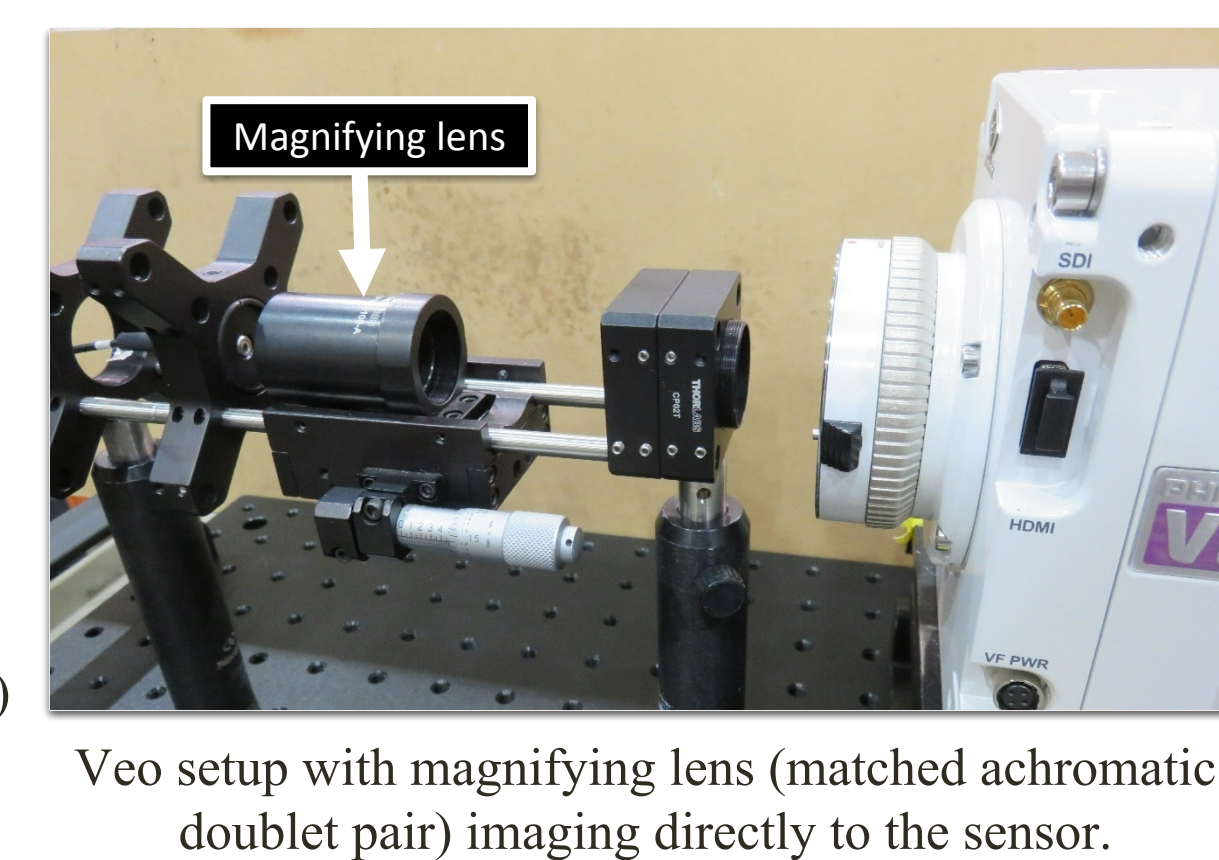
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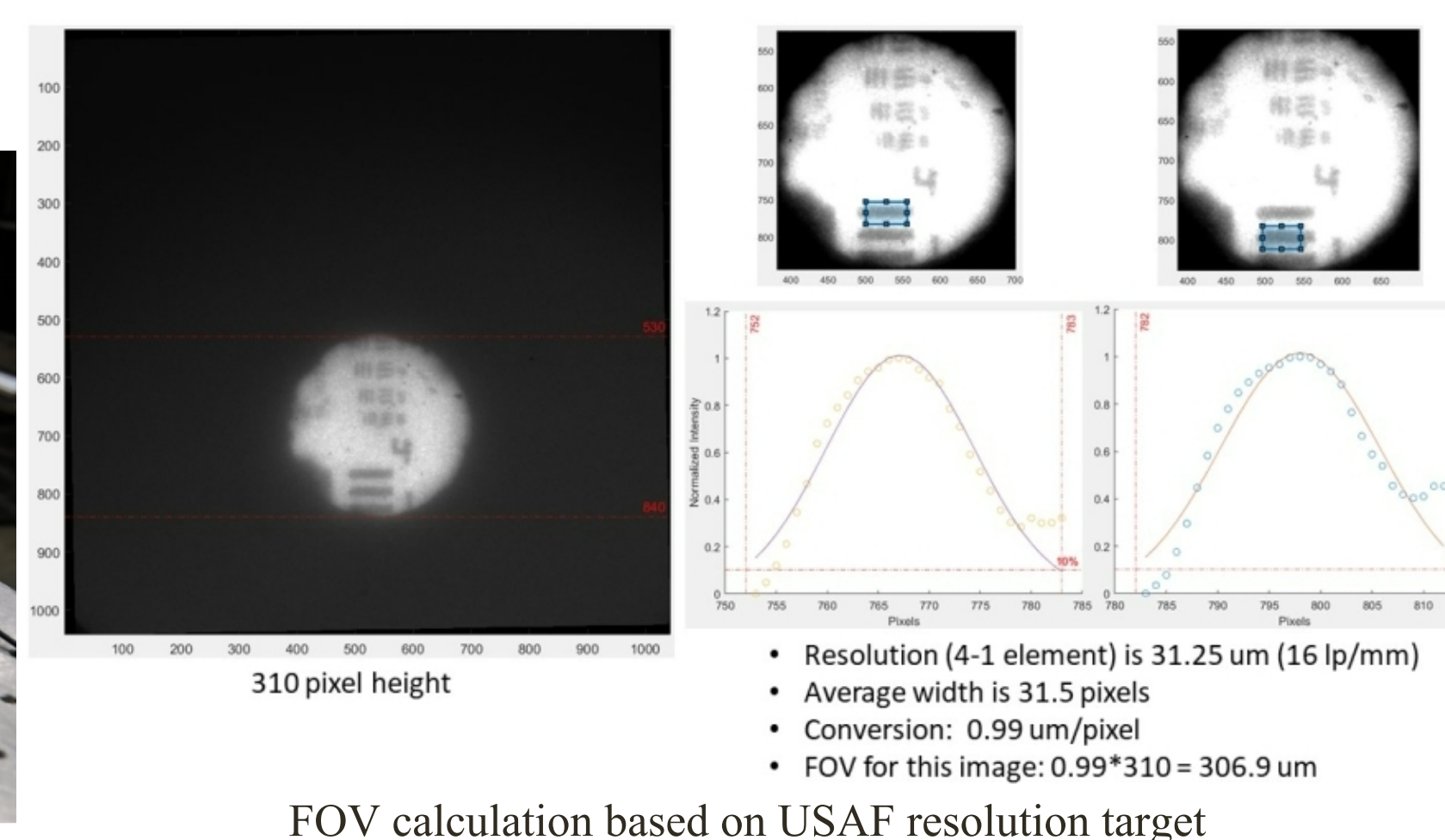
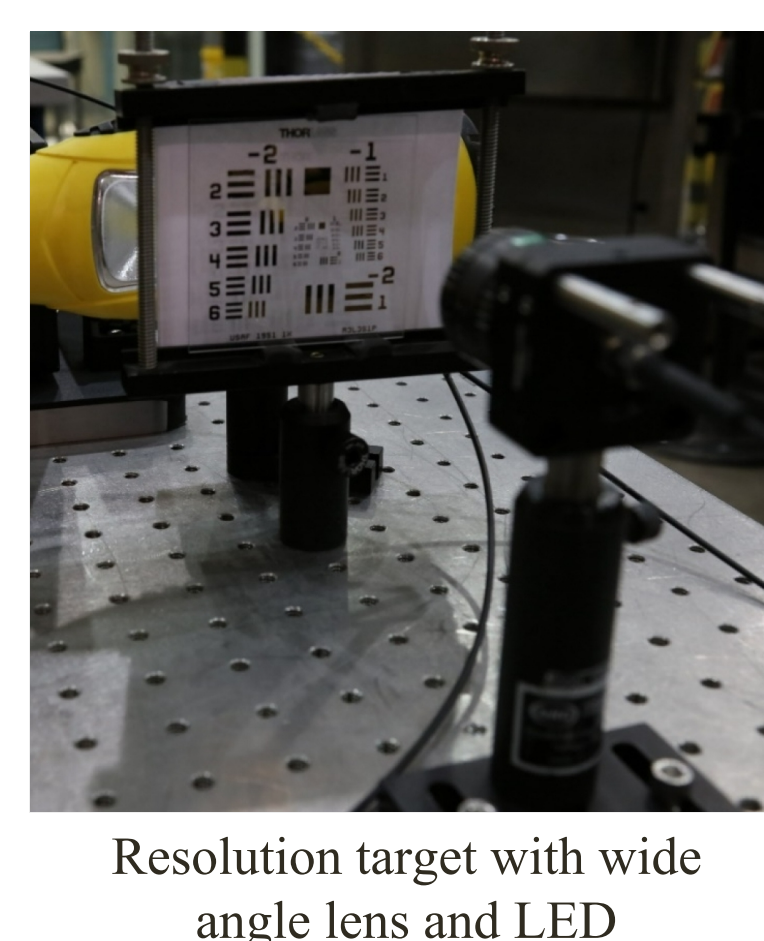
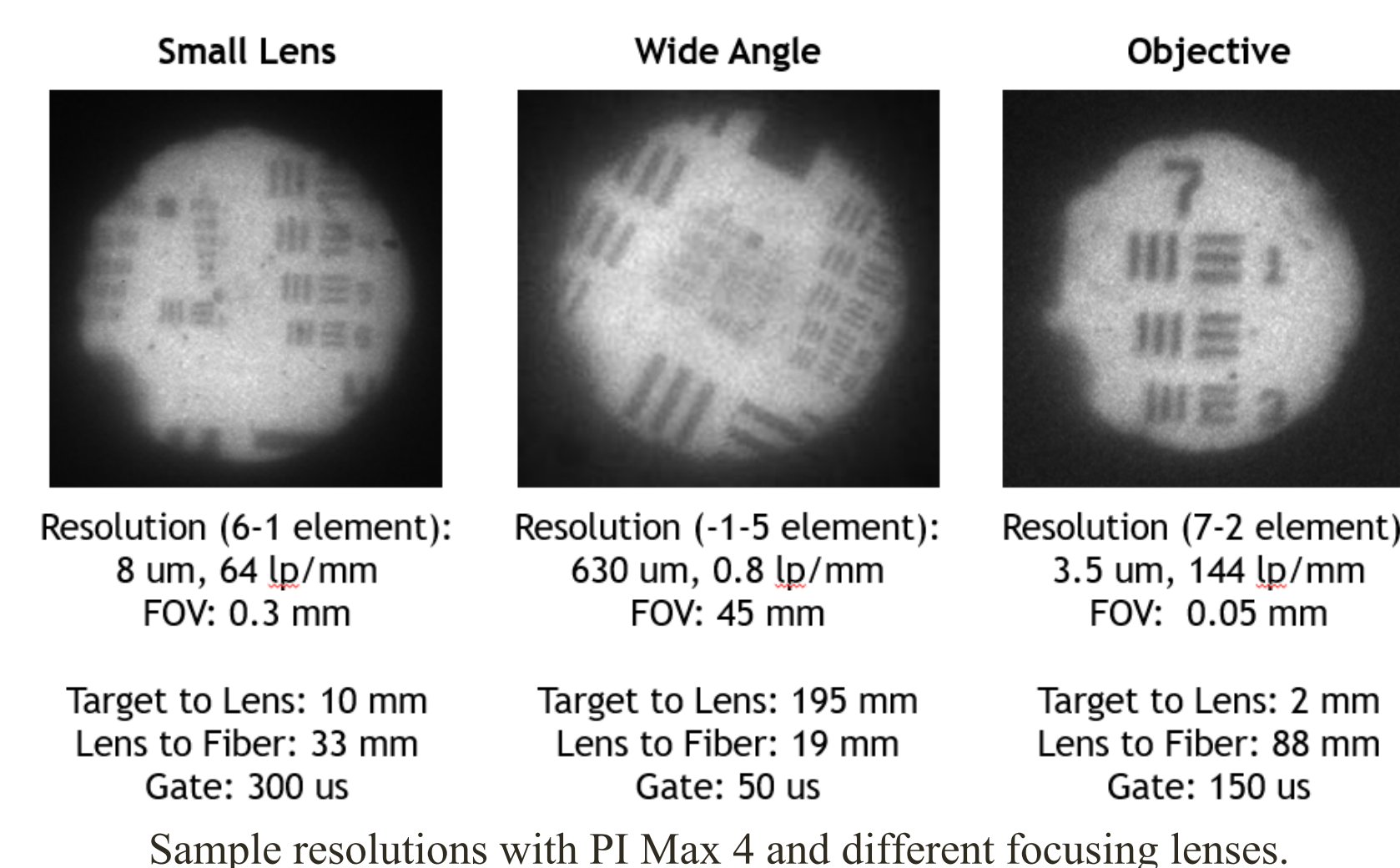


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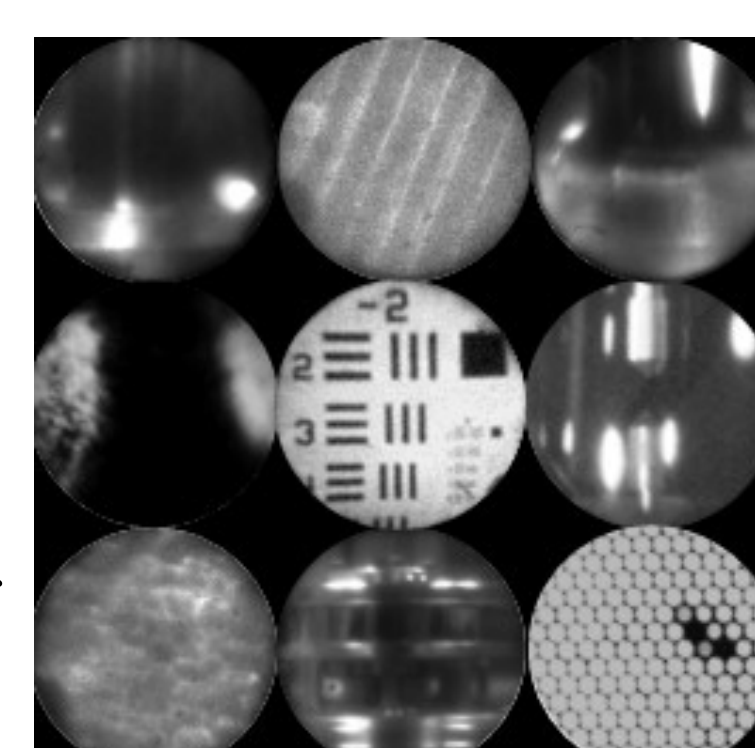


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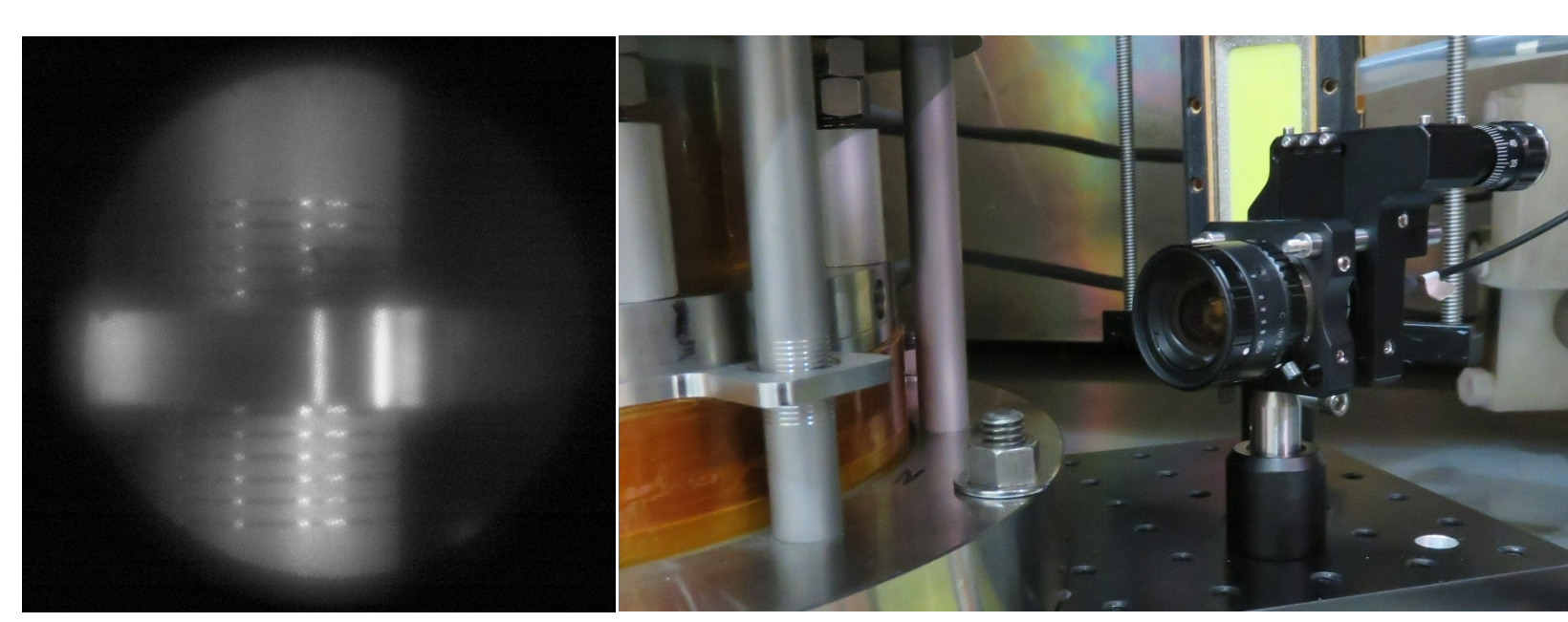


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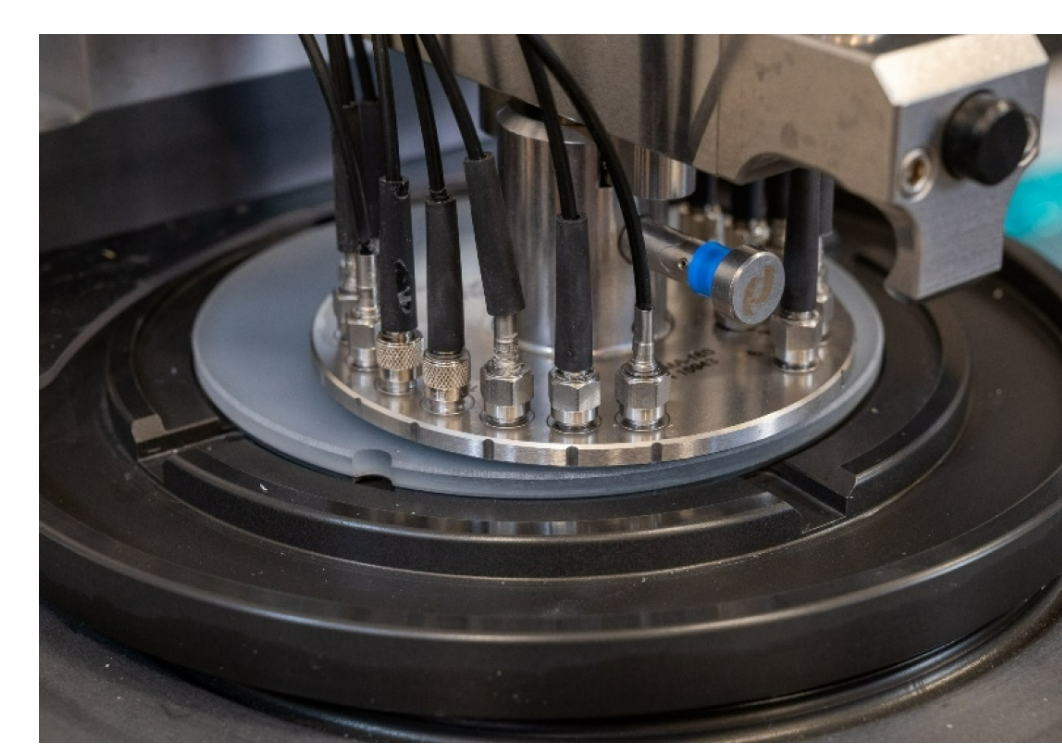
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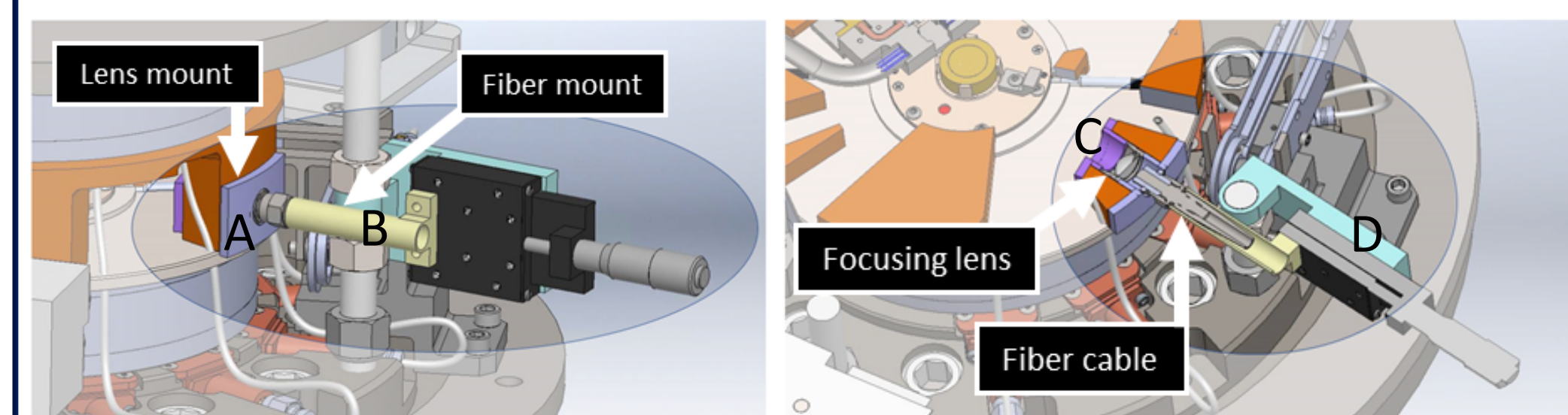
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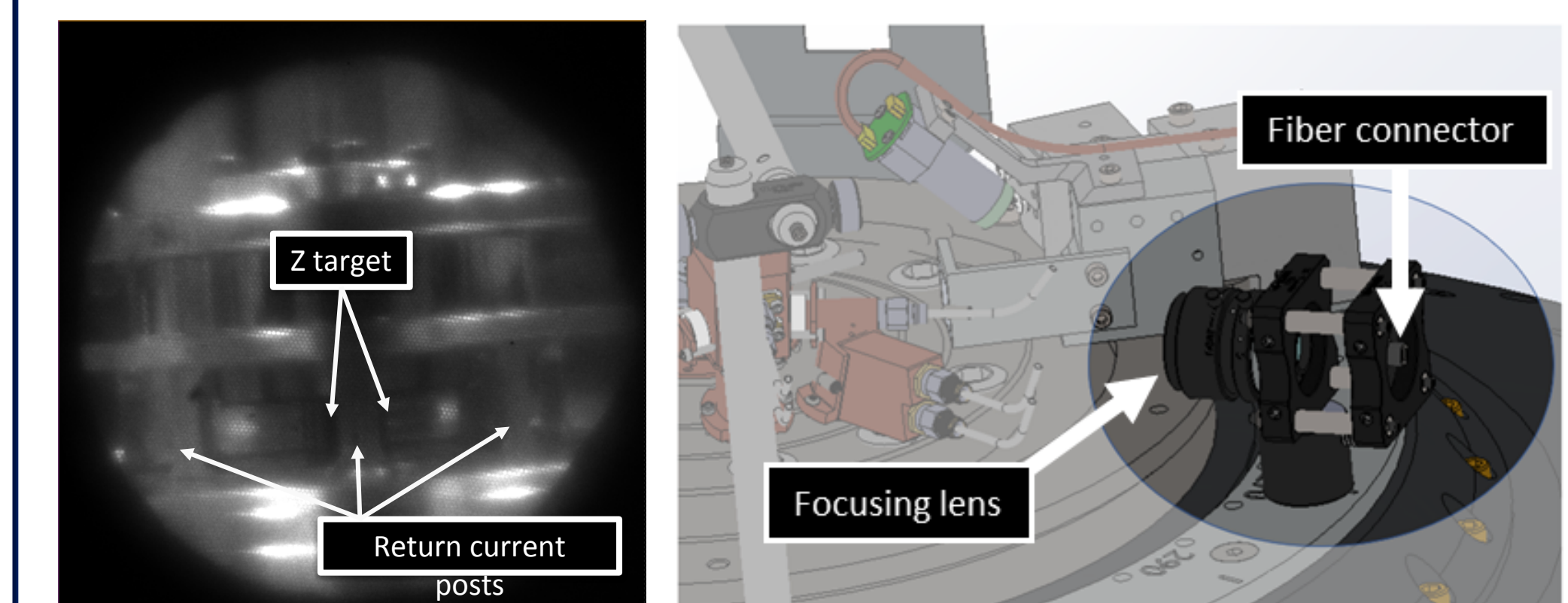
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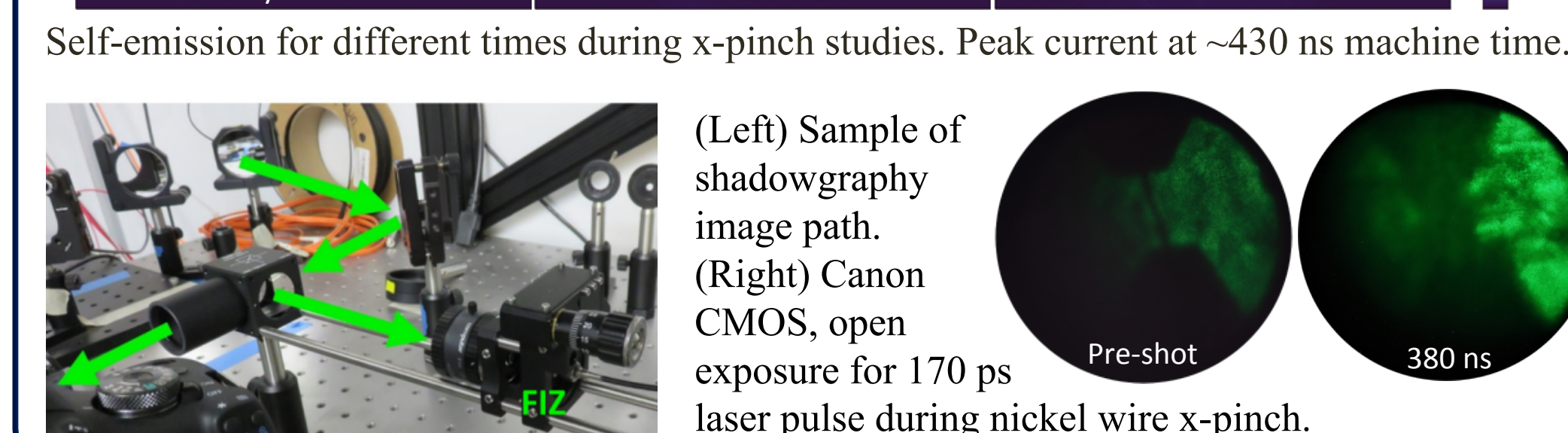
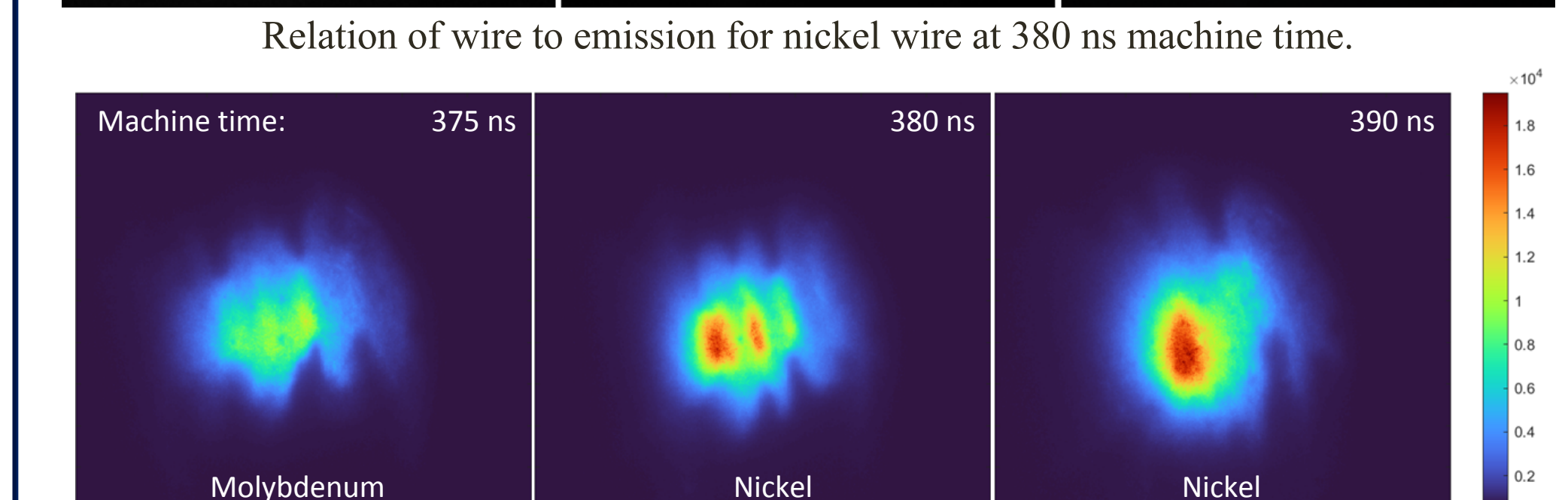
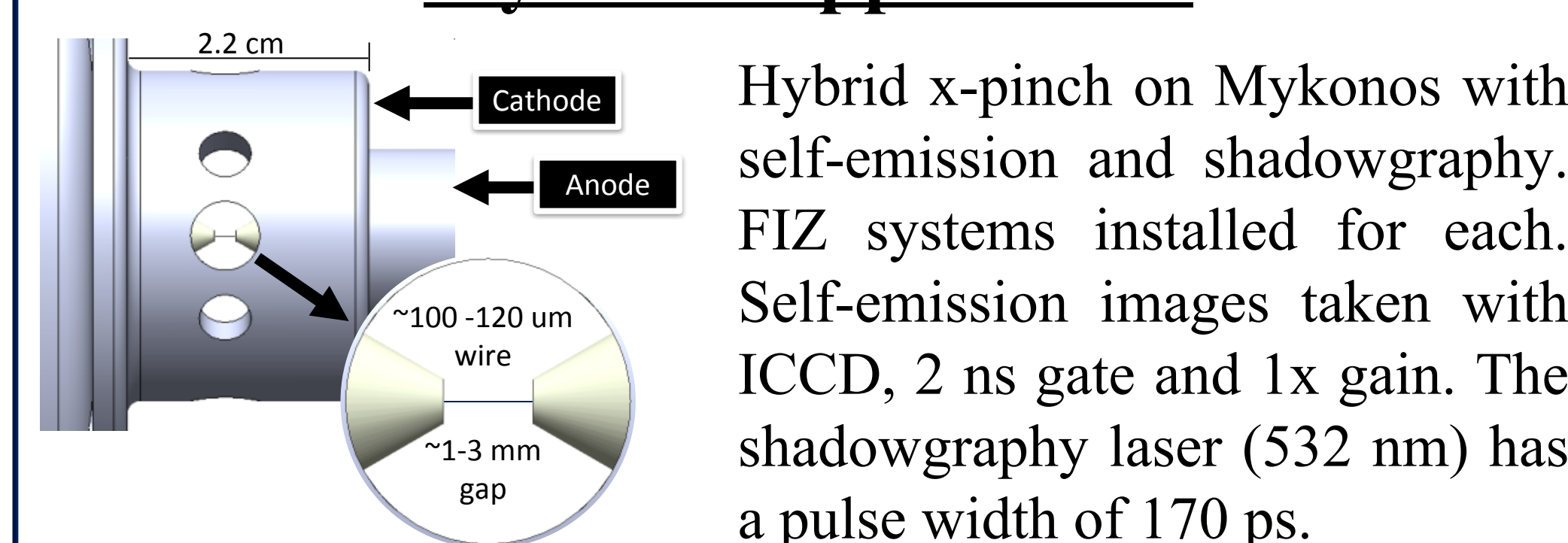
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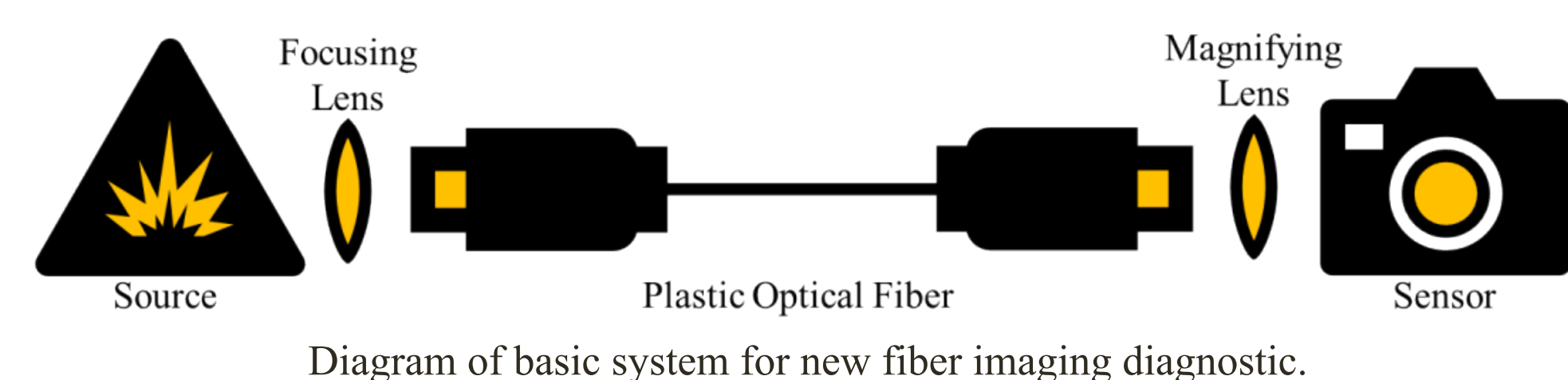
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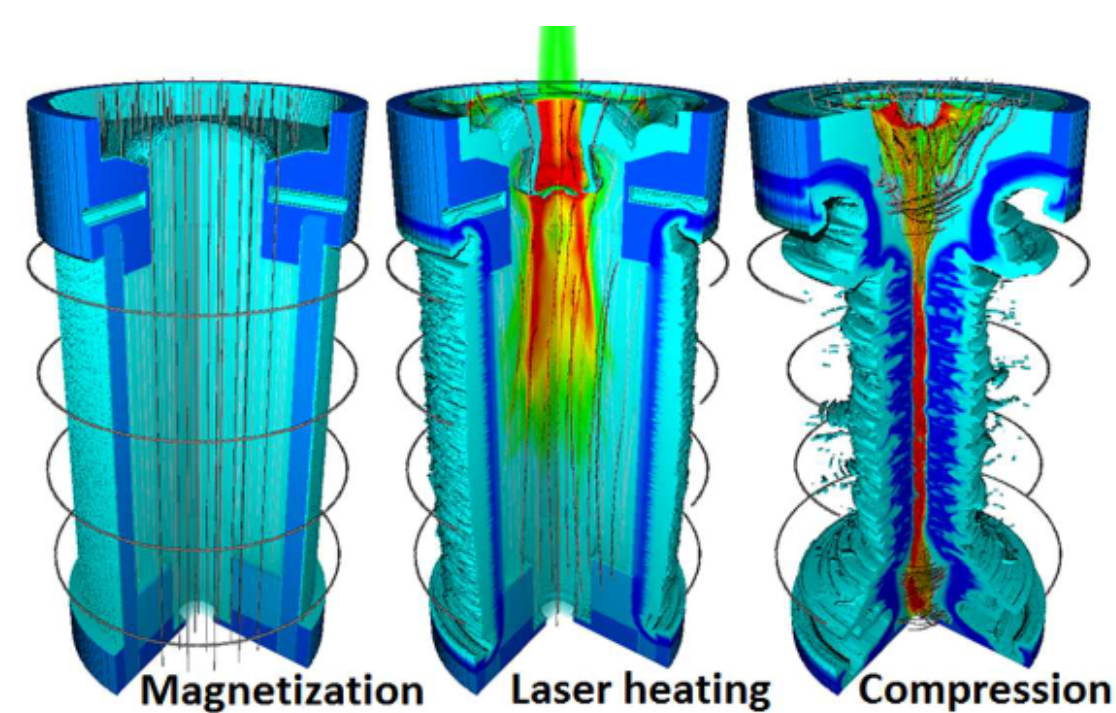
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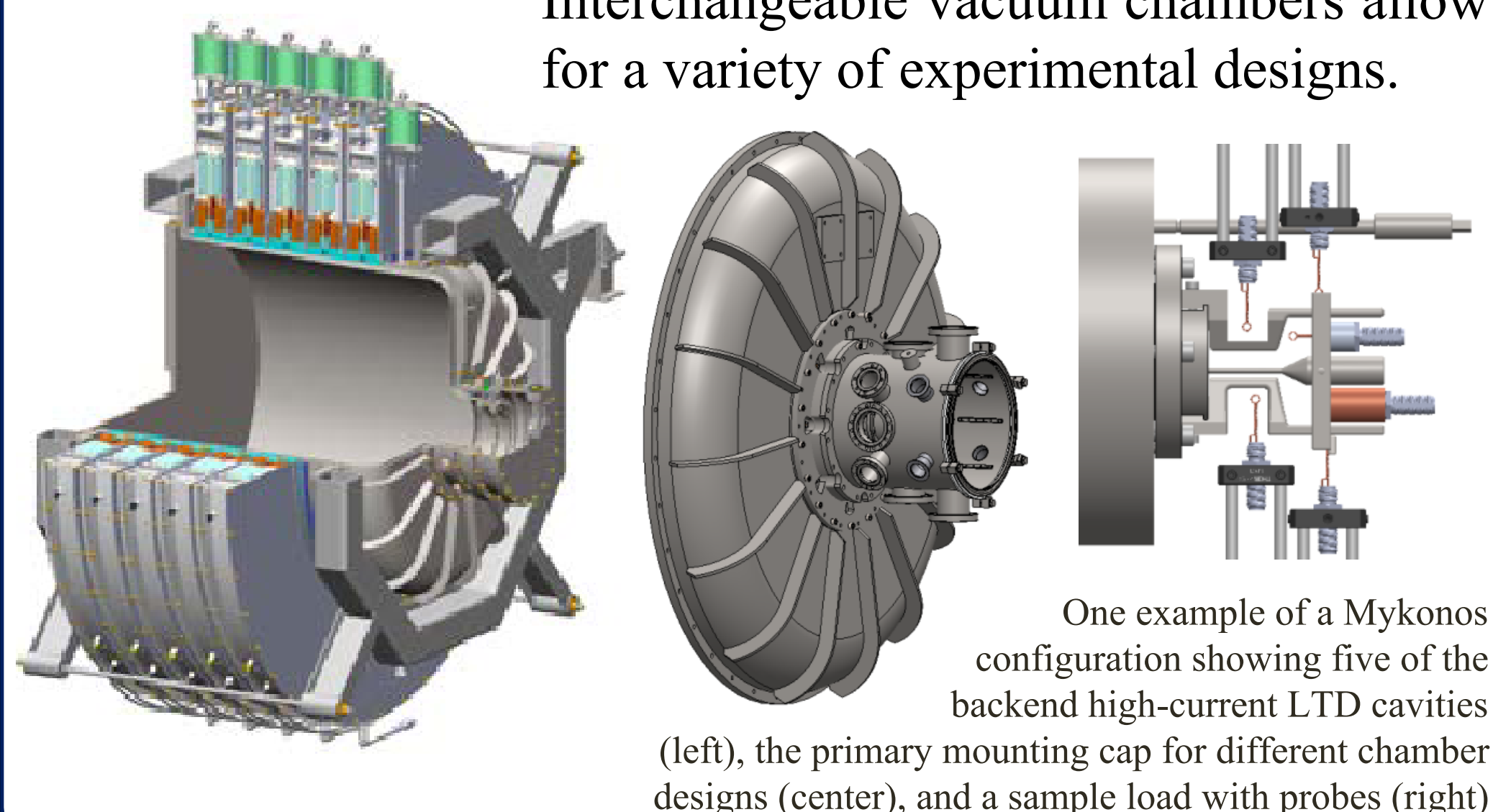
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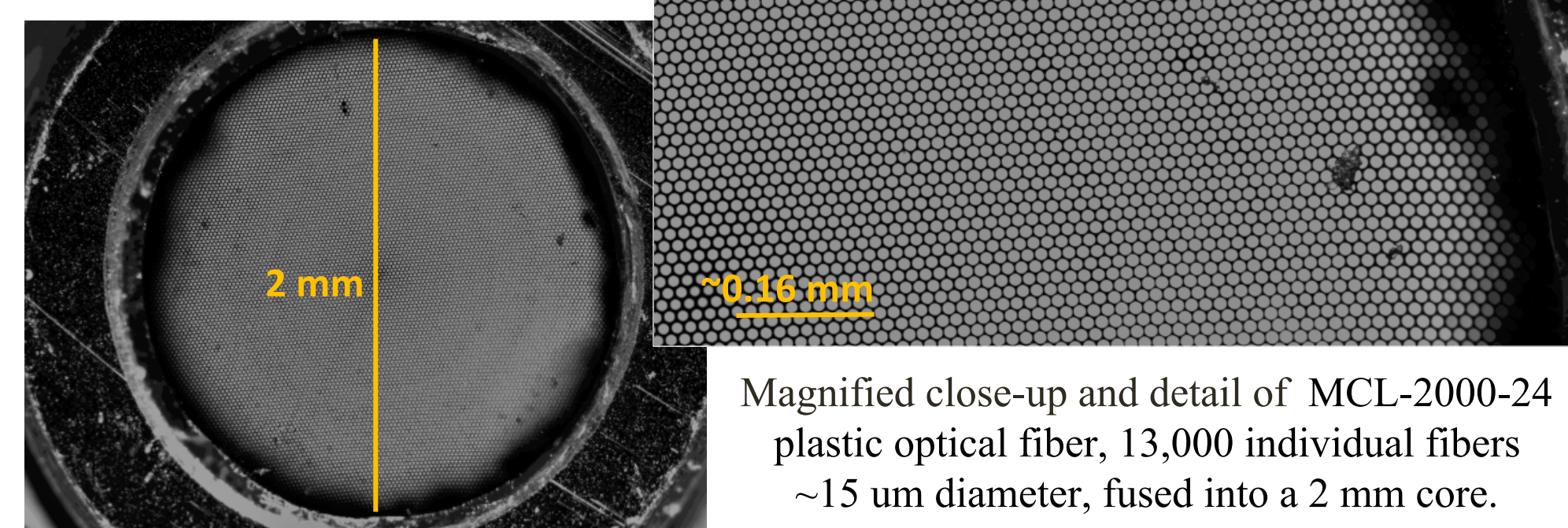
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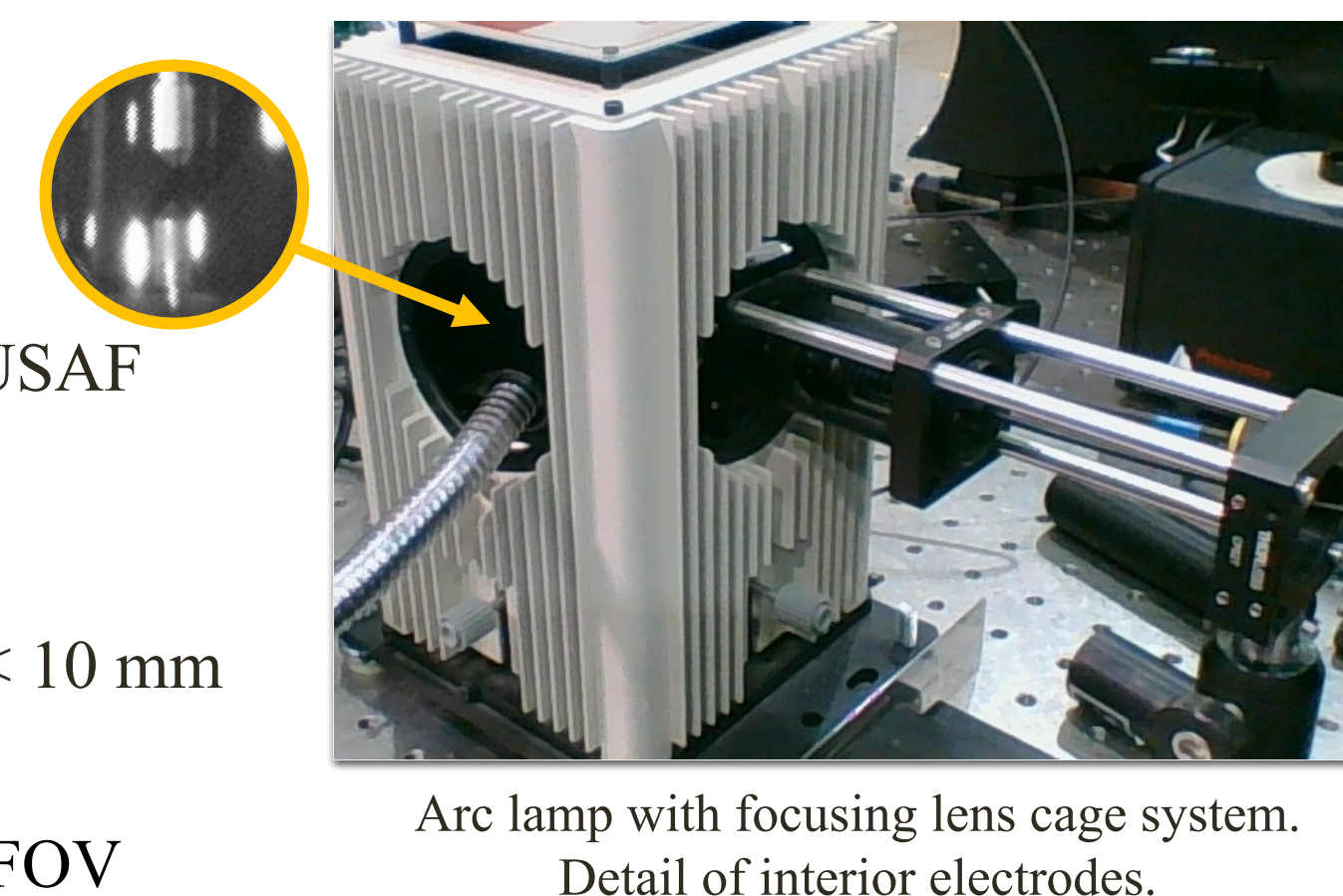
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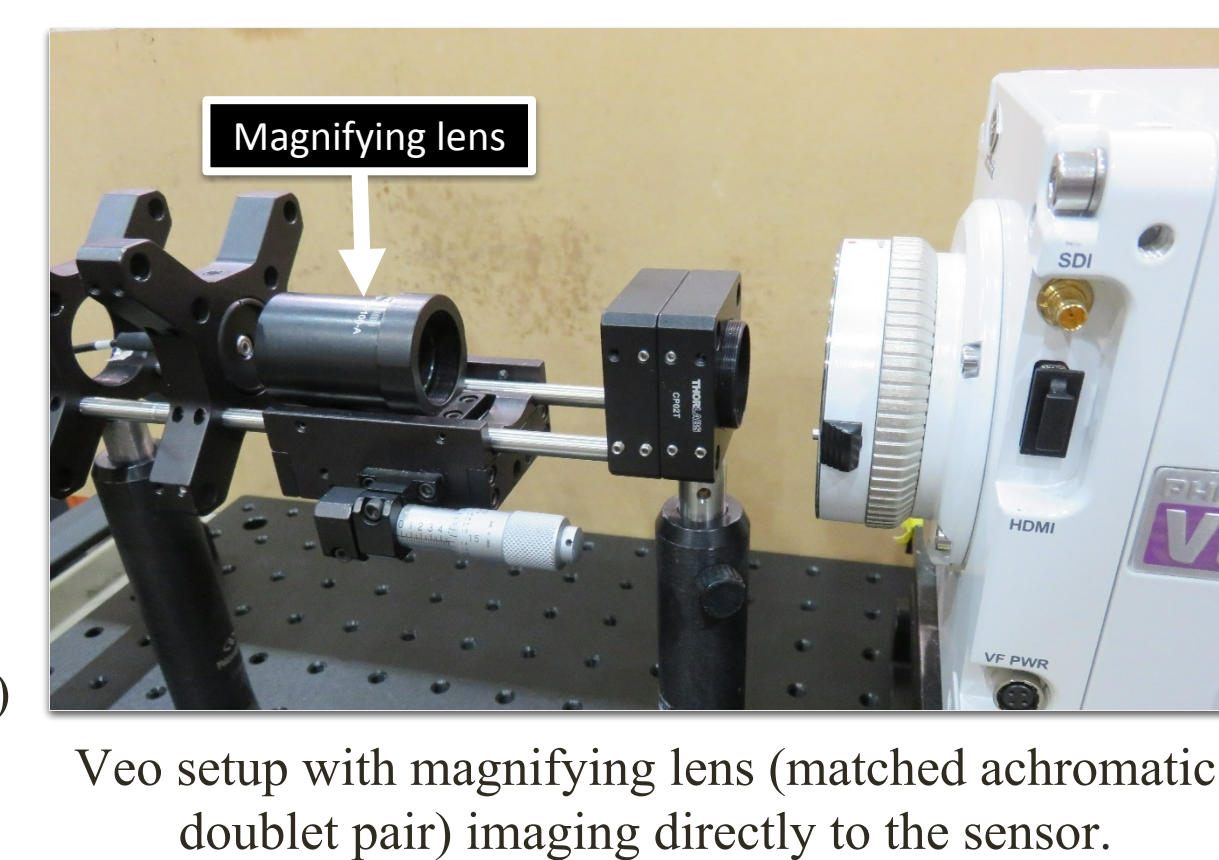
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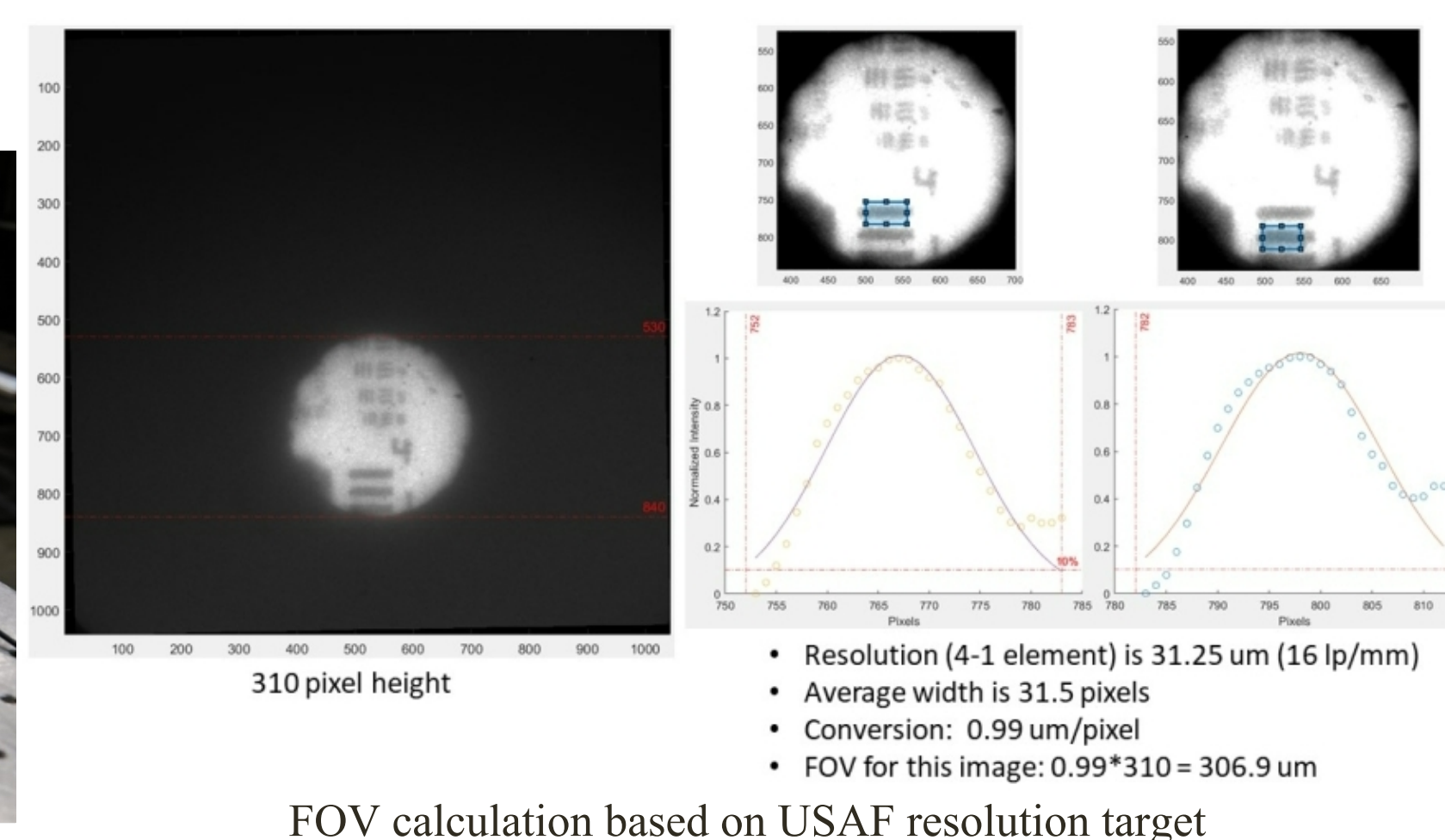
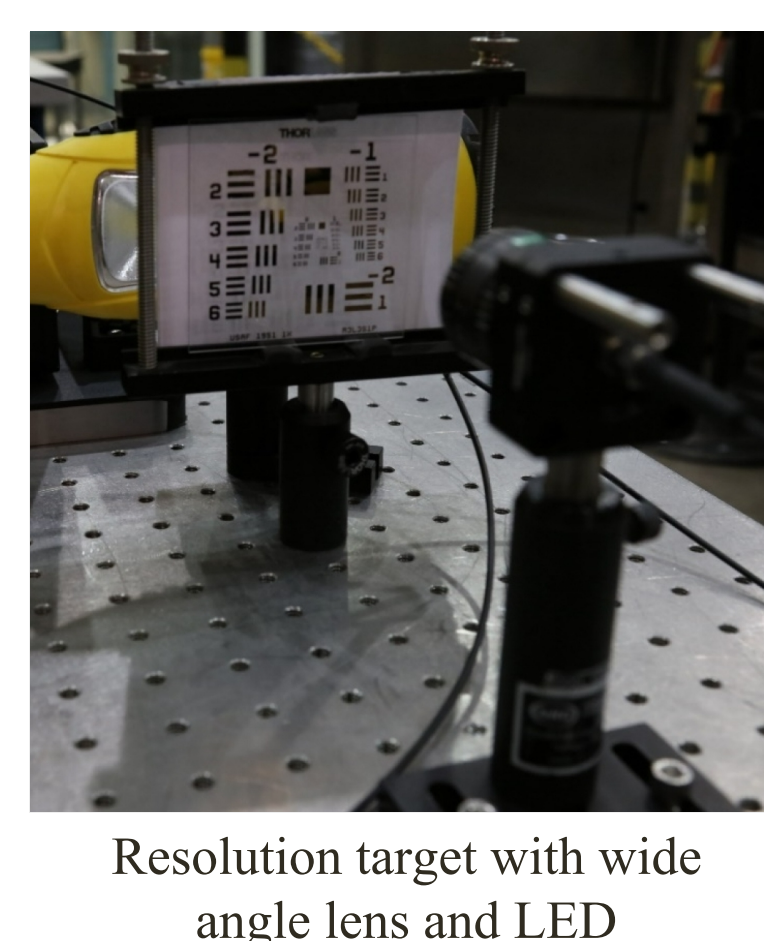
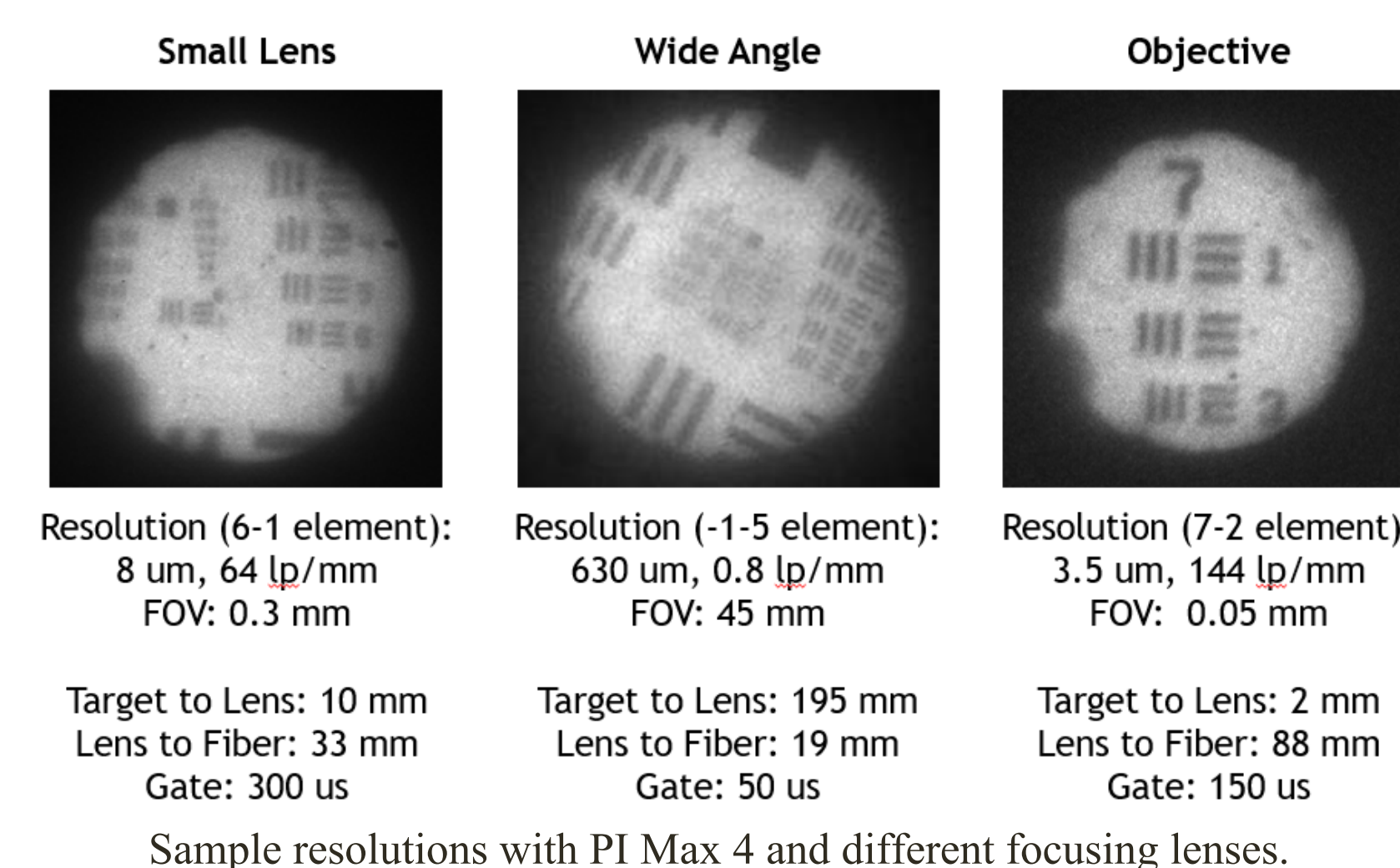


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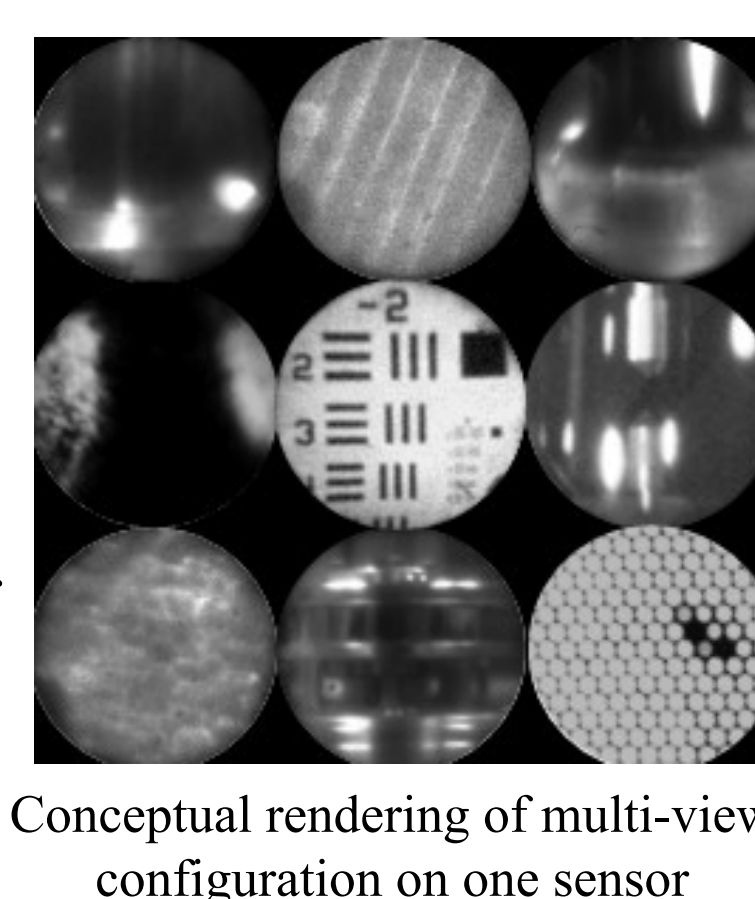


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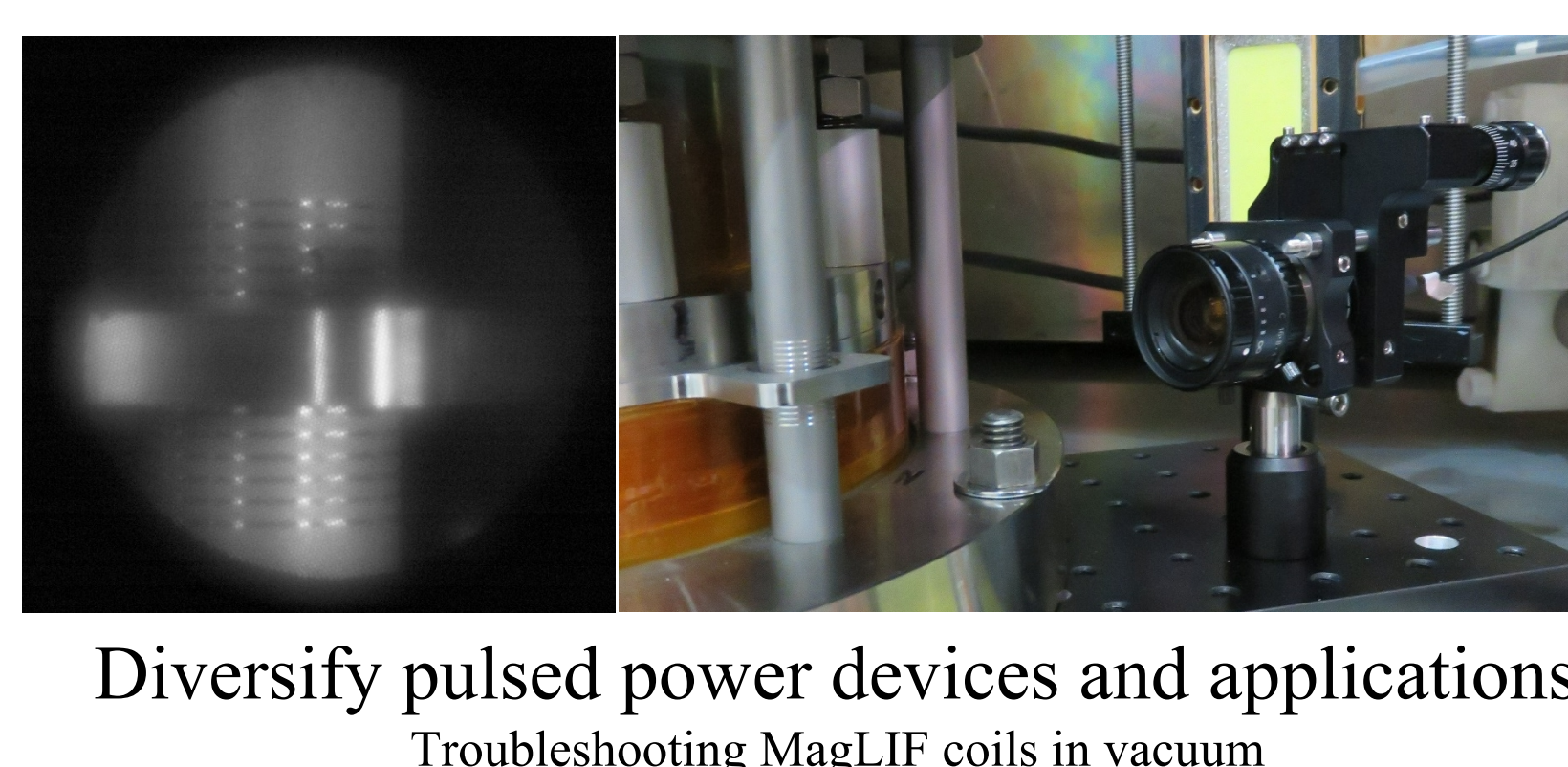


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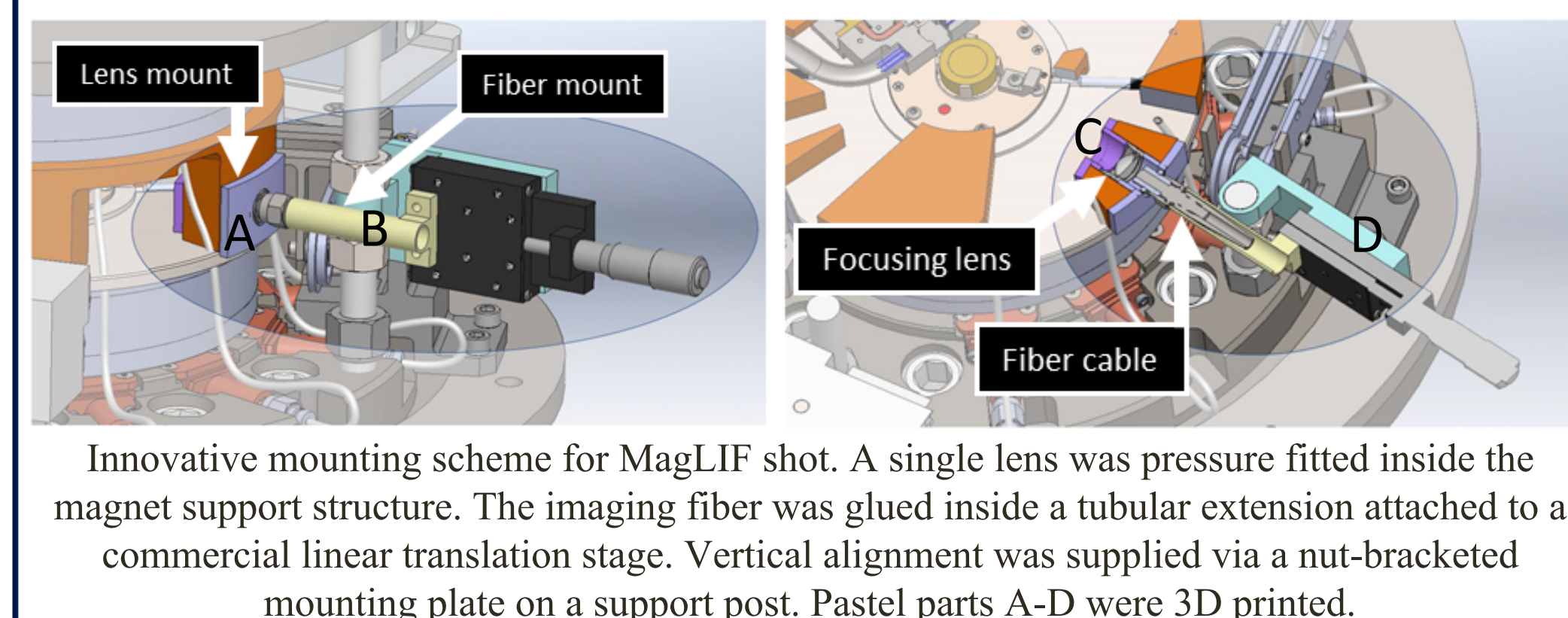


Potential Advancements

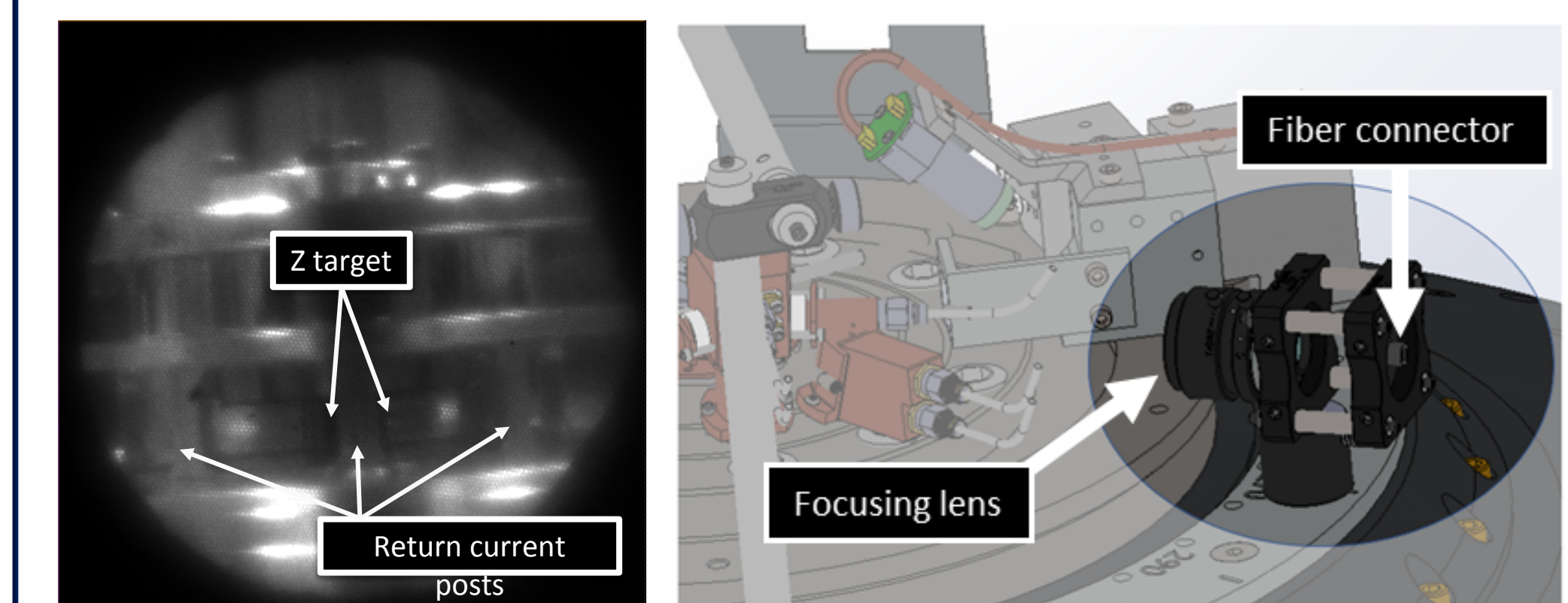


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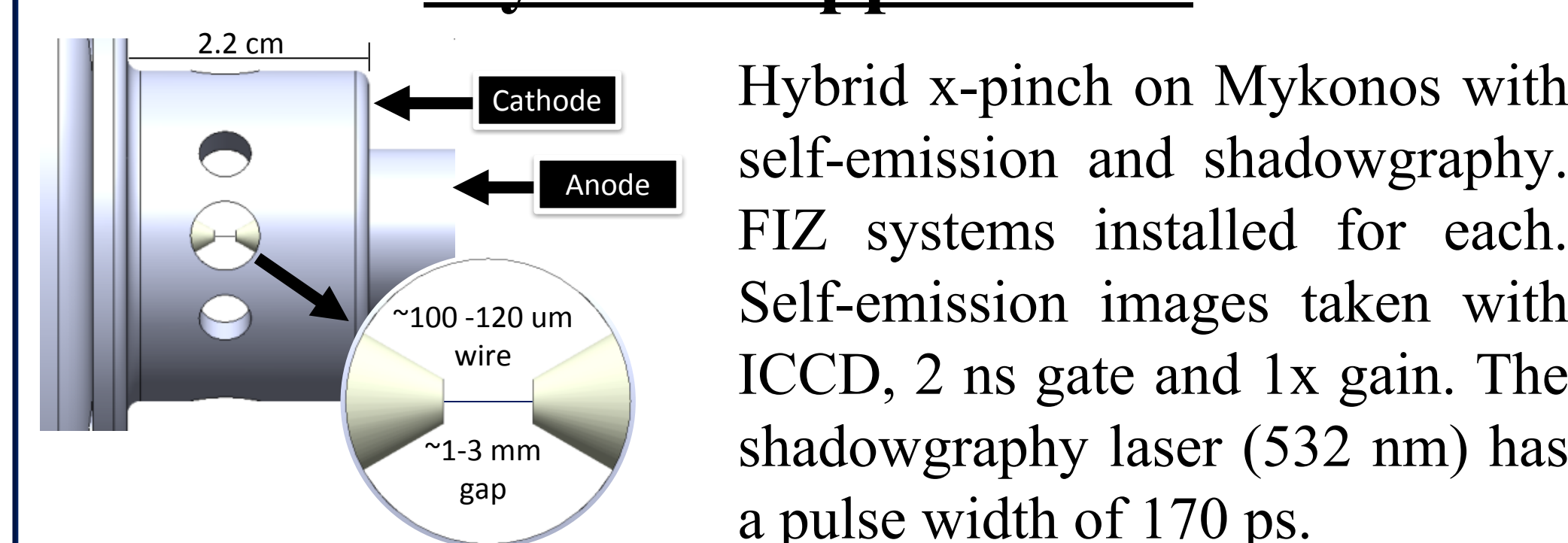


Innovative mounting scheme for MagLIF shot. A single lens was pressure fitted inside the magnet support structure. The imaging fiber was glued inside a tubular extension attached to a commercial linear translation stage. Vertical alignment was supplied via a nut-bracketed mounting plate on a support post. Pastel parts A-D were 3D printed.



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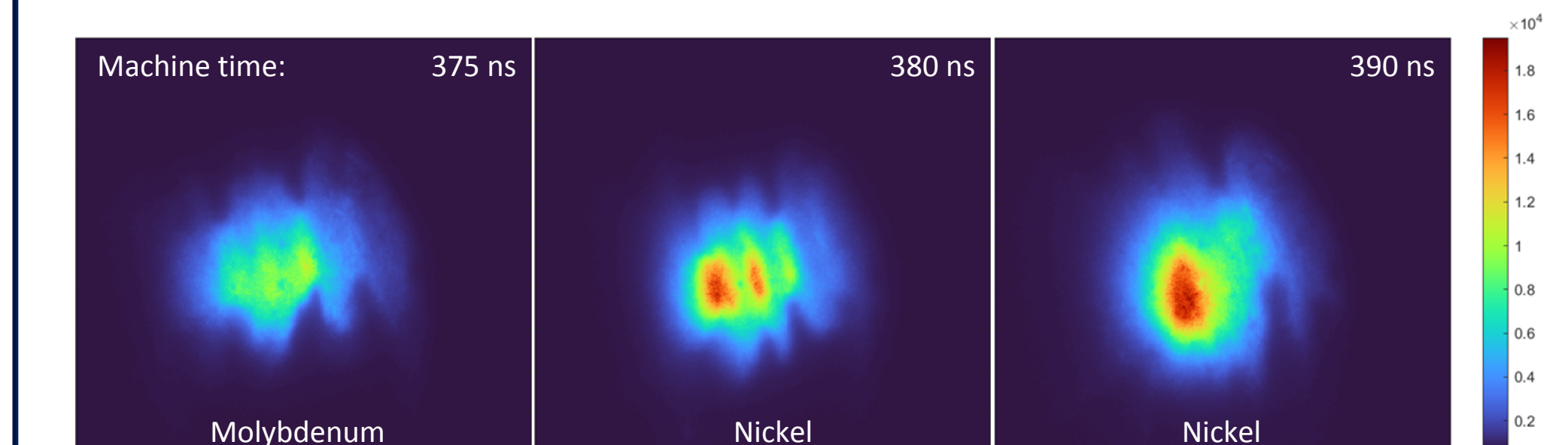
Mykonos Applications



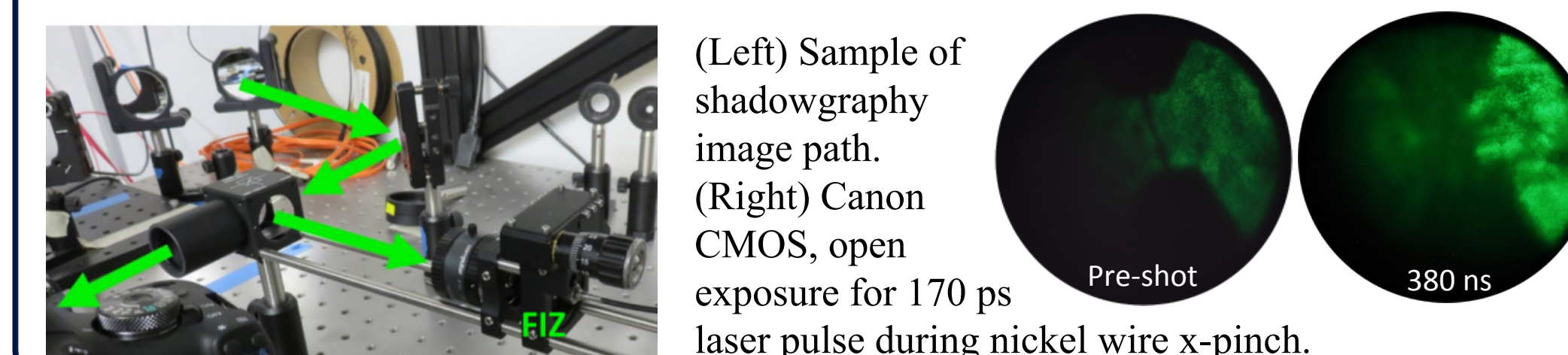
Hybrid x-pinch on Mykonos with self-emission and shadowgraphy. FIZ systems installed for each. Self-emission images taken with ICCD, 2 ns gate and 1x gain. The shadowgraphy laser (532 nm) has a pulse width of 170 ps.



Relation of wire to emission for nickel wire at 380 ns machine time.



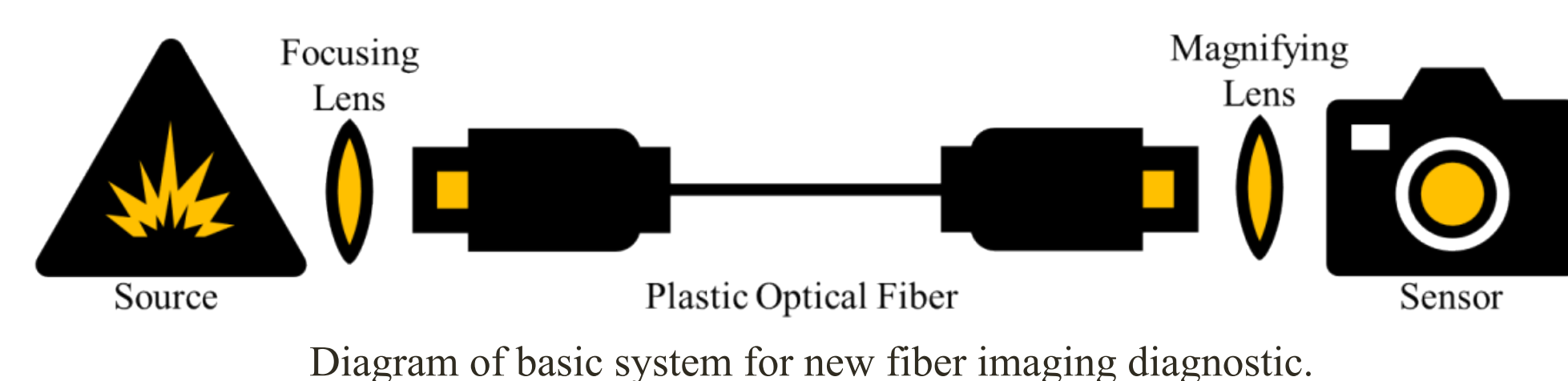
Self-emission for different times during x-pinch studies. Peak current at ~430 ns machine time.



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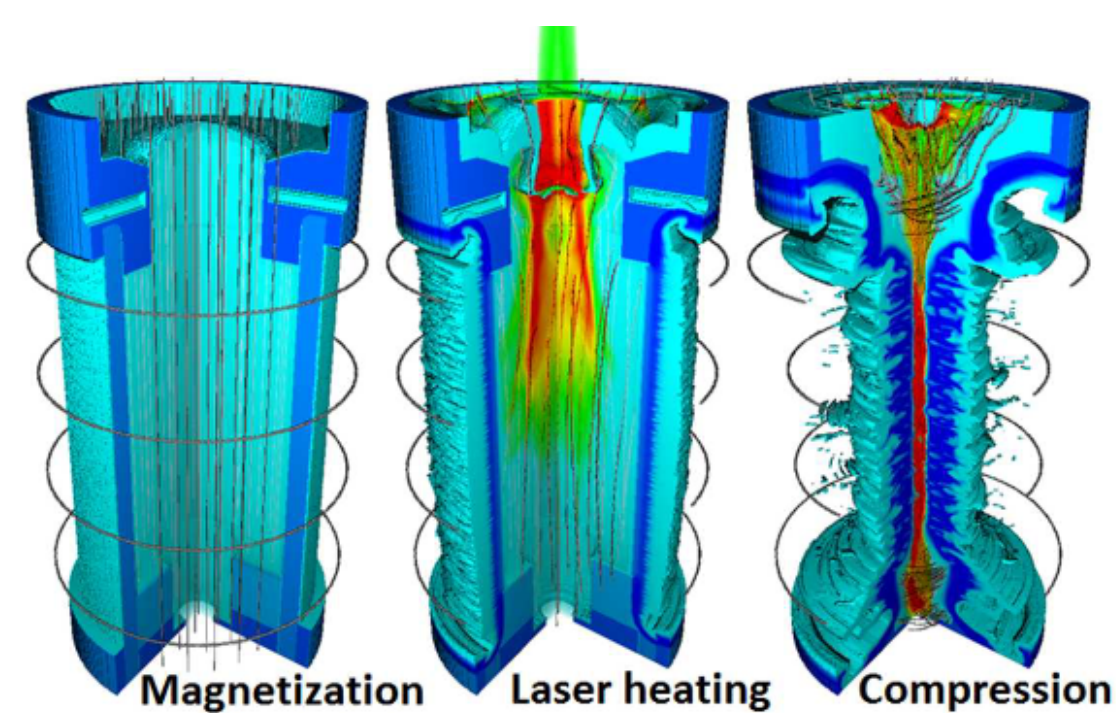
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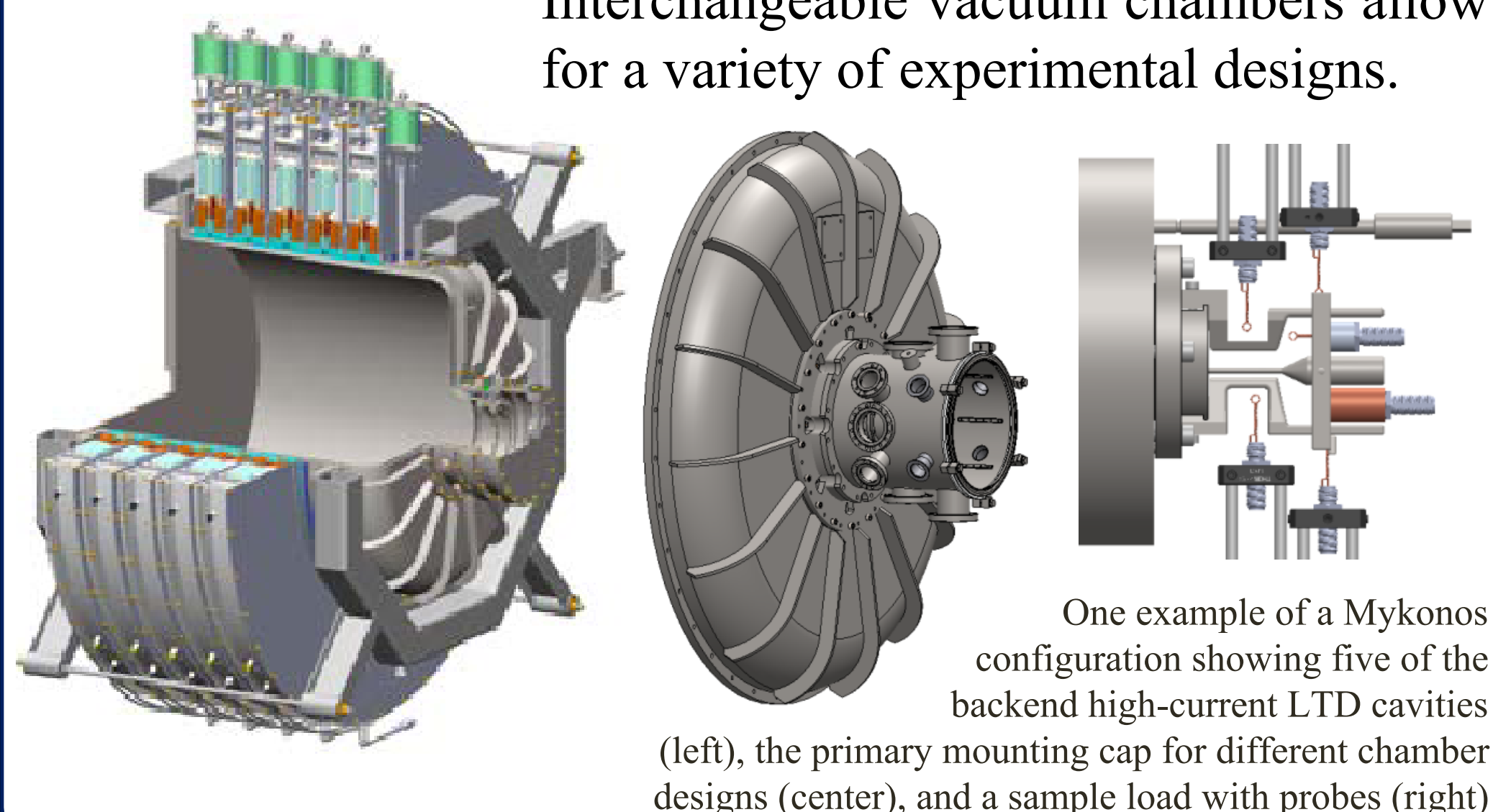
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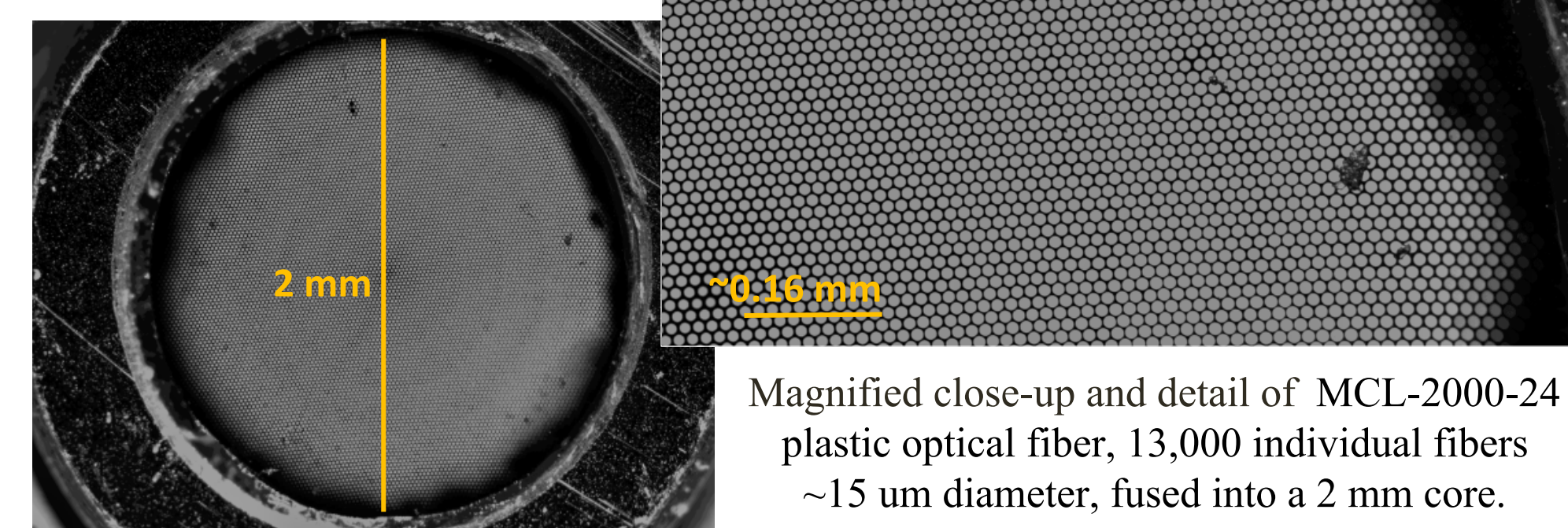
Interchangeable vacuum chambers allow for a variety of experimental designs.



FIZ Diagnostic Development

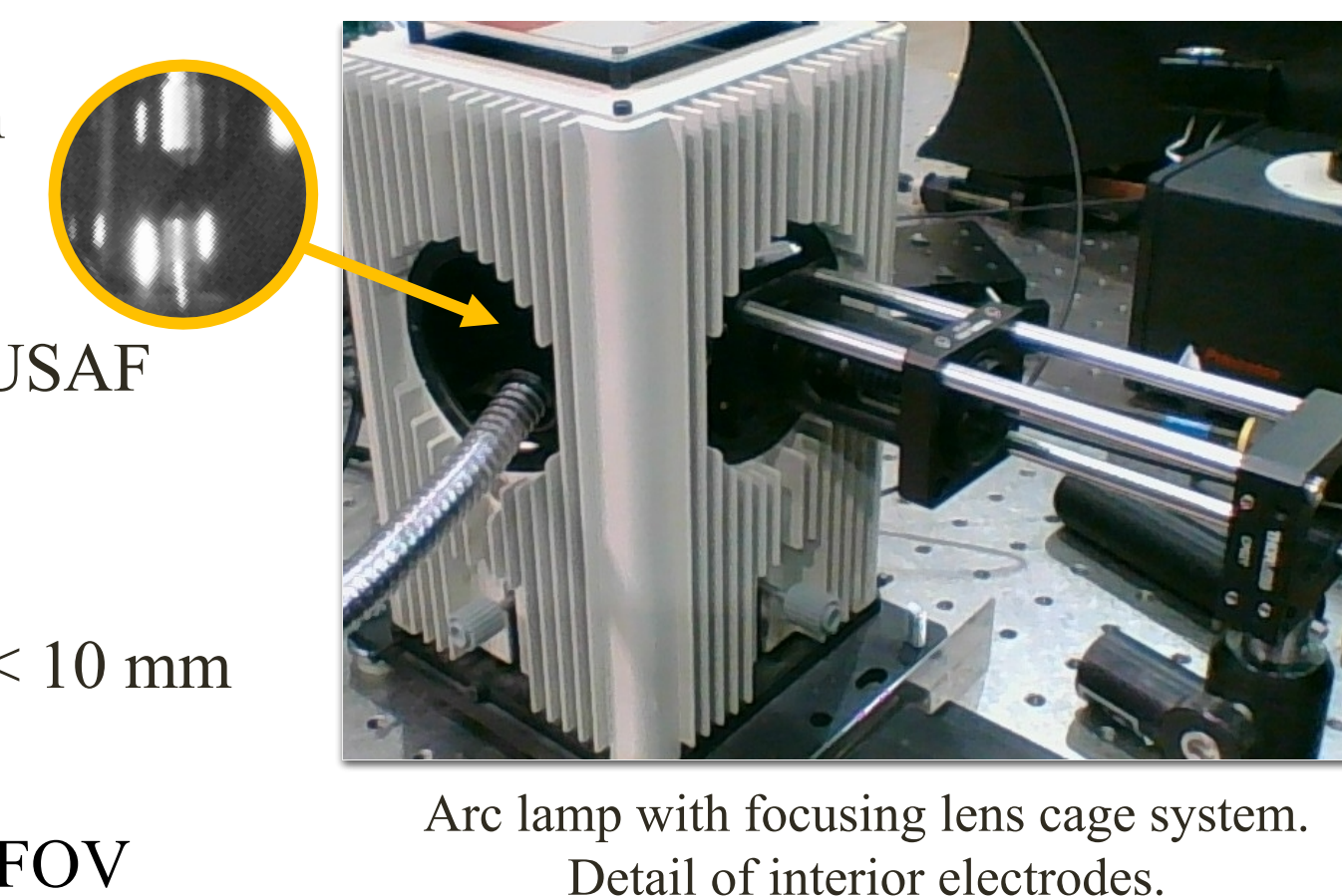
Plastic Optical Fiber

- MCL-2000-24 (Asahi Kasei Corporation)
 - Core: polymethyl methacrylate (PMMA)
 - Jacket: polyethylene (PE)
 - 13,000 individual fibers, each core ~15 micron in diameter
 - 2 mm diameter fused core, 2.4 mm diameter with jacket
- Step-index multimode
- Transmission rate
 - 4.97 ns/m
- Attenuation
 - ~0.1 dB/m (450-600 nm)
 - Higher loss below 450 nm and above 600 nm
- 0.5 NA
- 1.49 refractive index



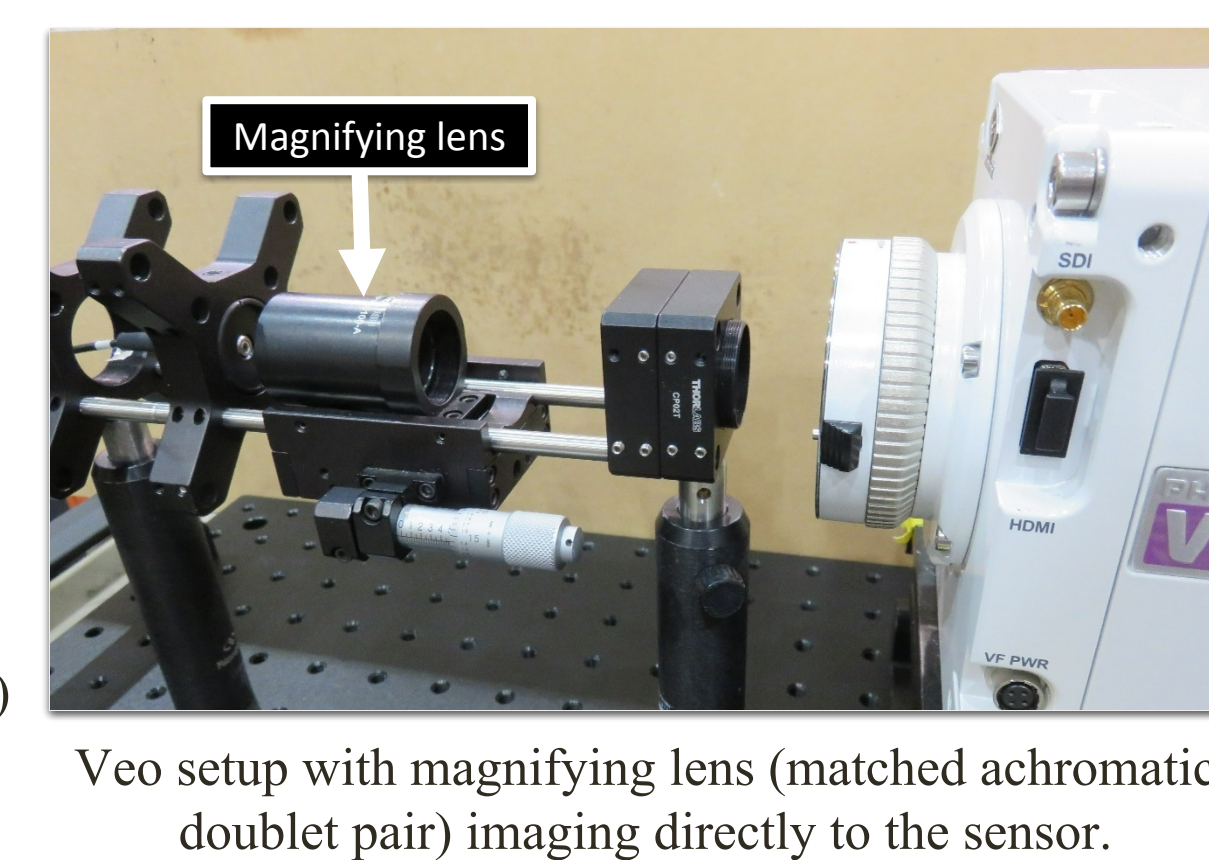
Source Side

- Input sources
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 - LED with 1951 USAF resolution target
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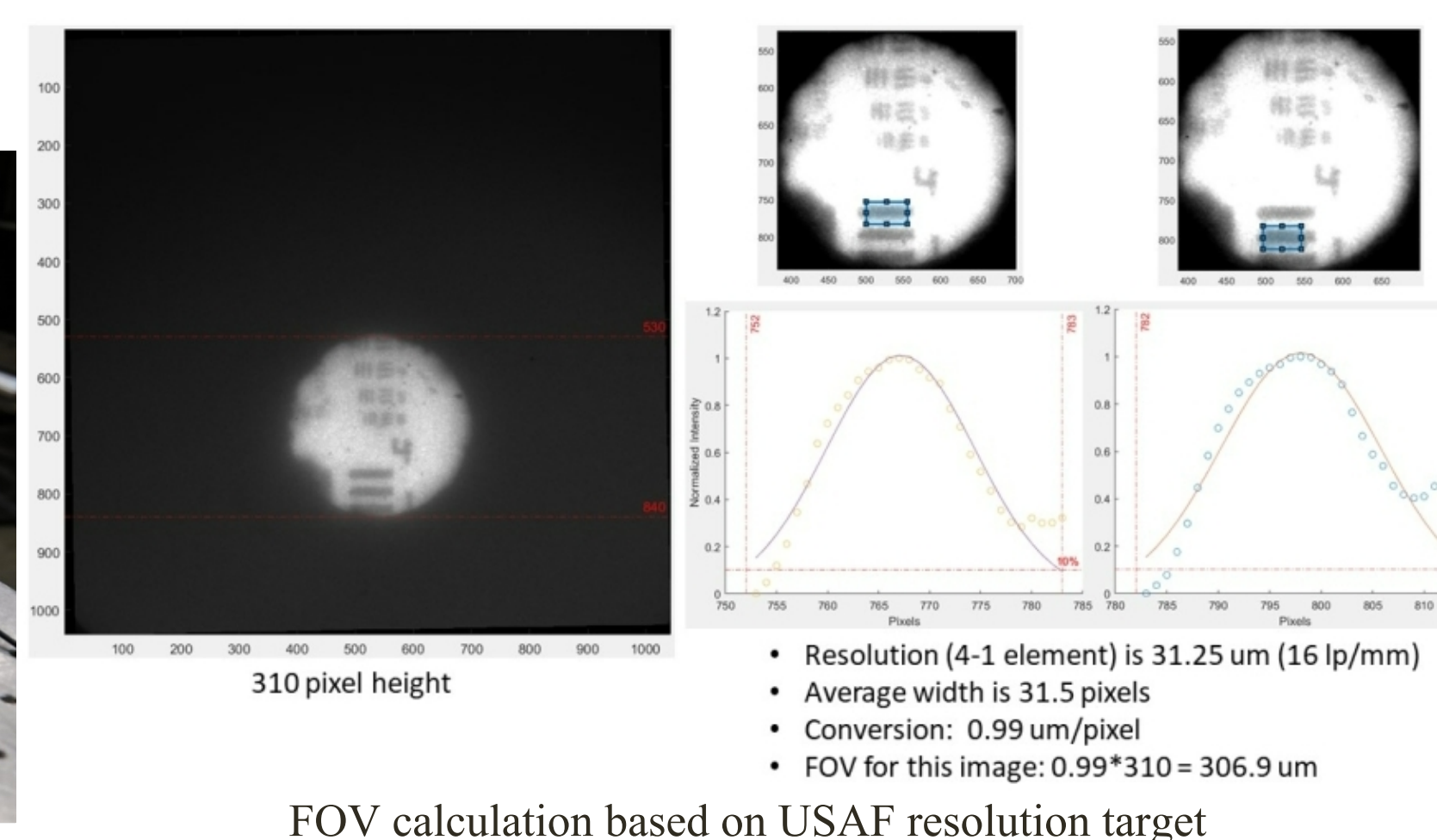
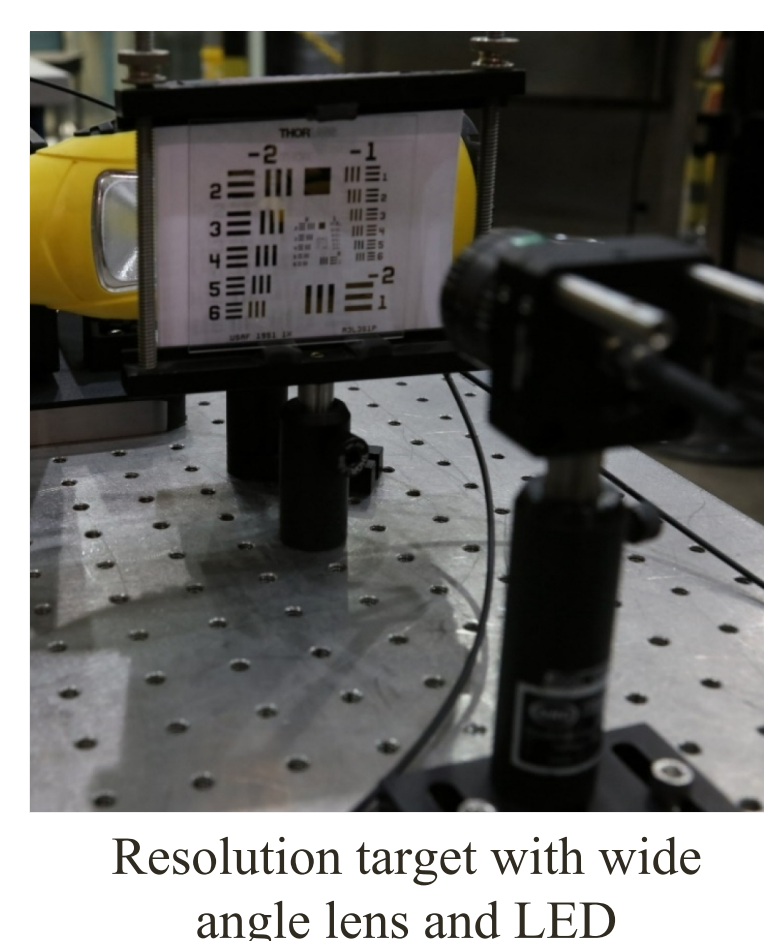
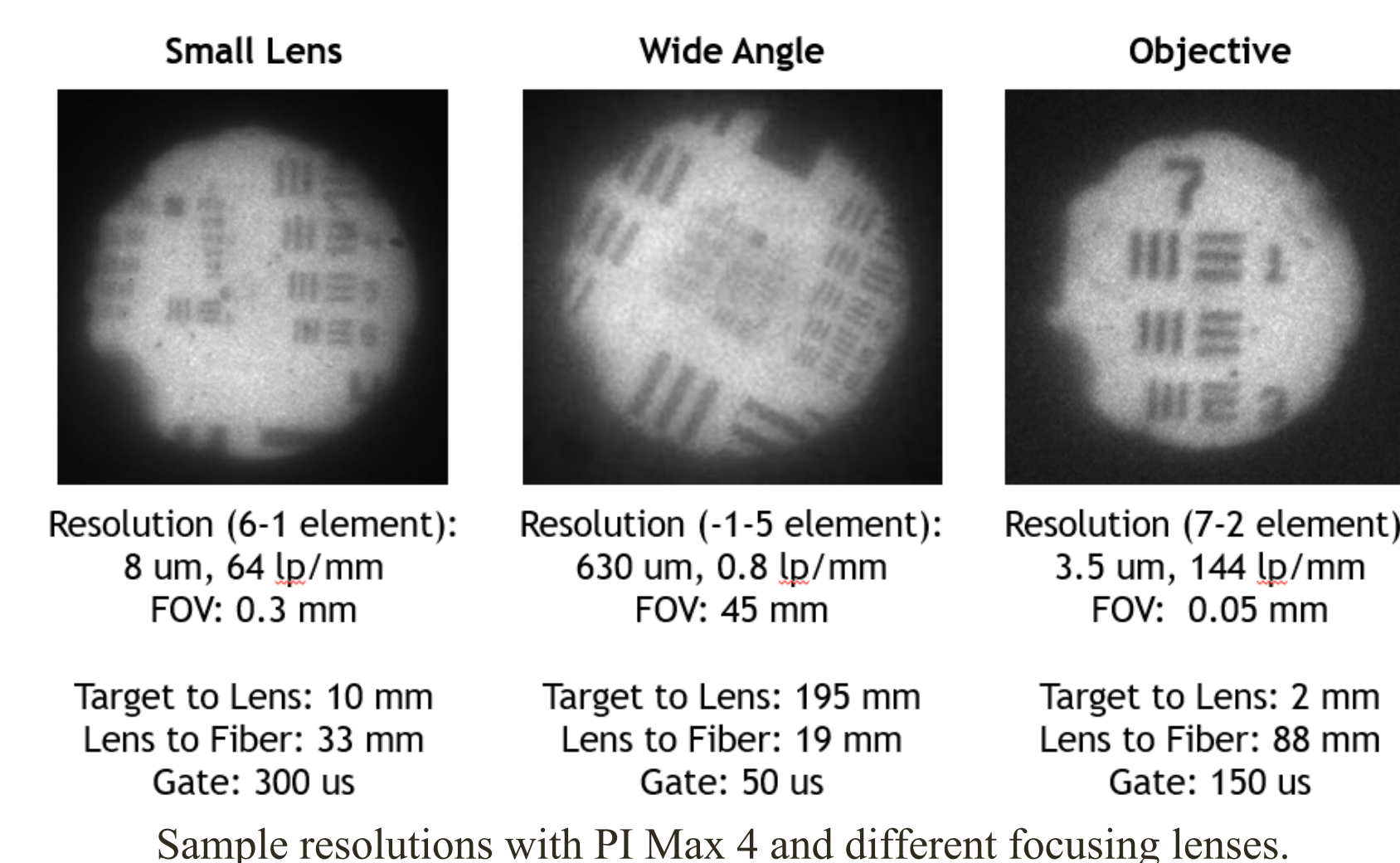


Sensor Side

- Fast cameras
 - PI Max 4 1024f
 - Gate minimum: 1.28 ns
 - ICCD, single frame
 - 13 um pixel size
 - 1 megapixel resolution
 - Phantom VEO 1310
 - Gate minimum: 1 us
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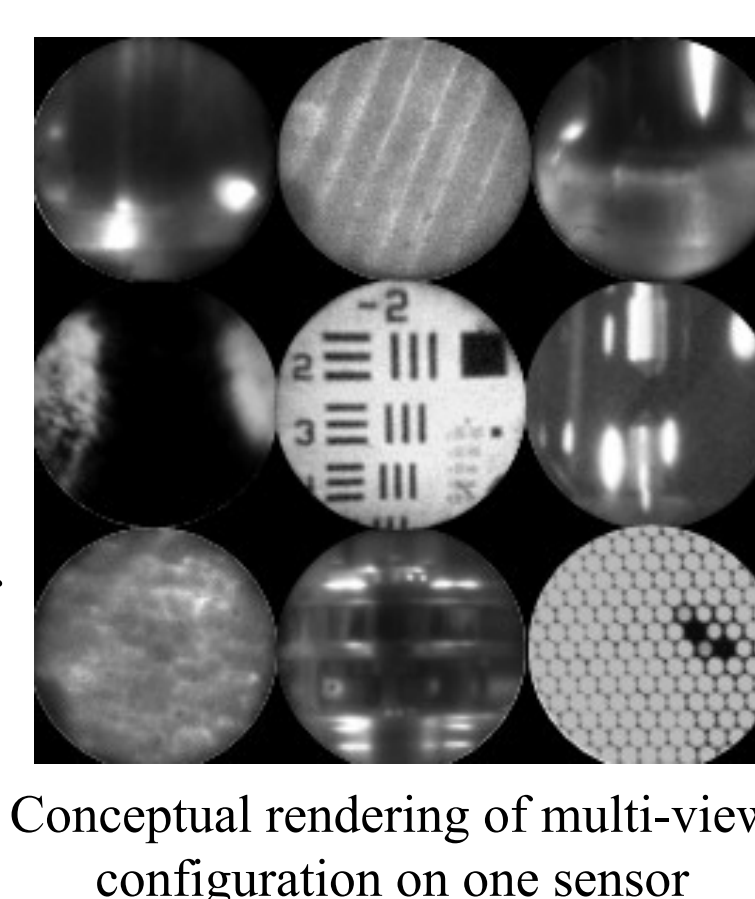


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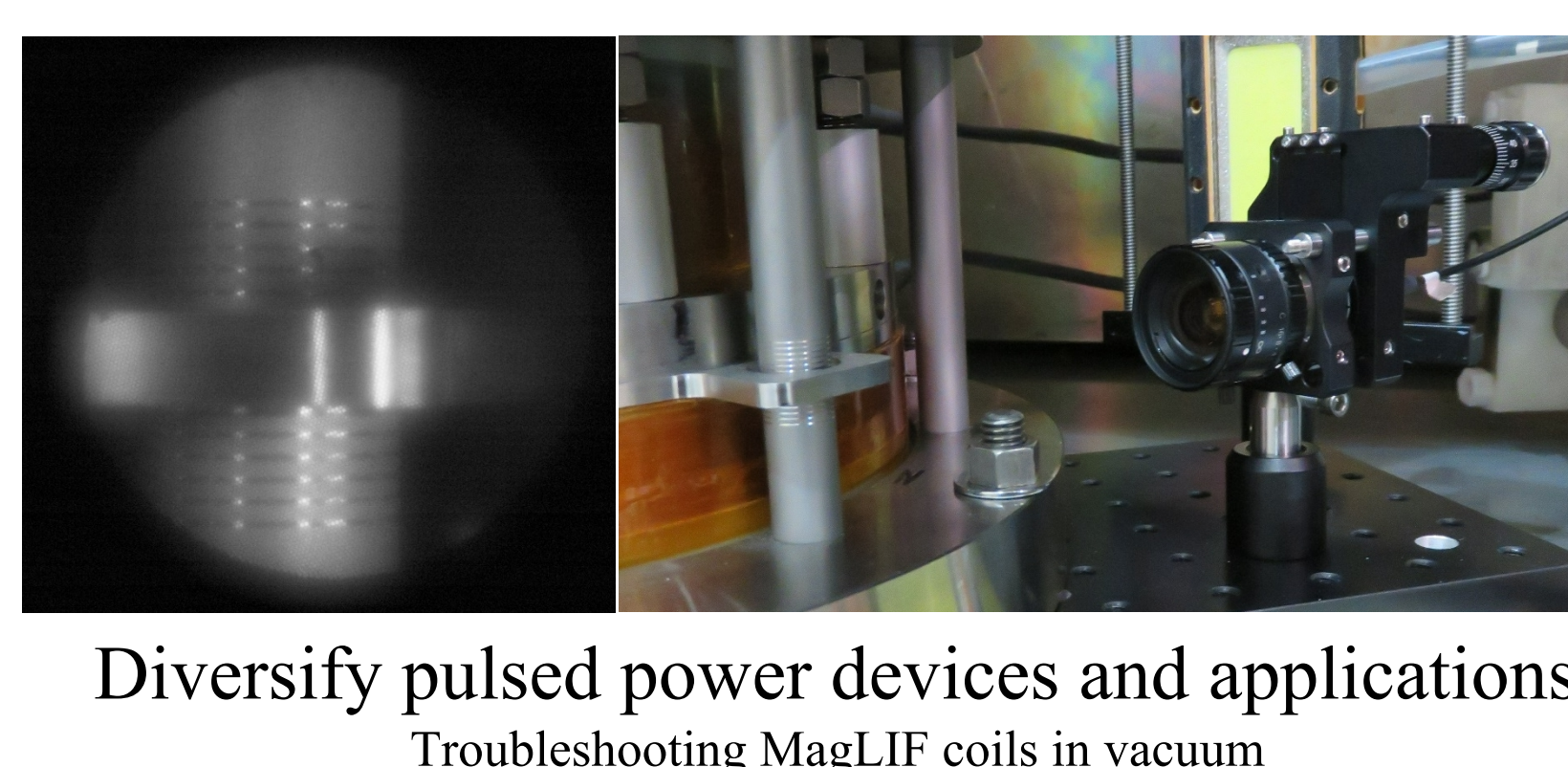


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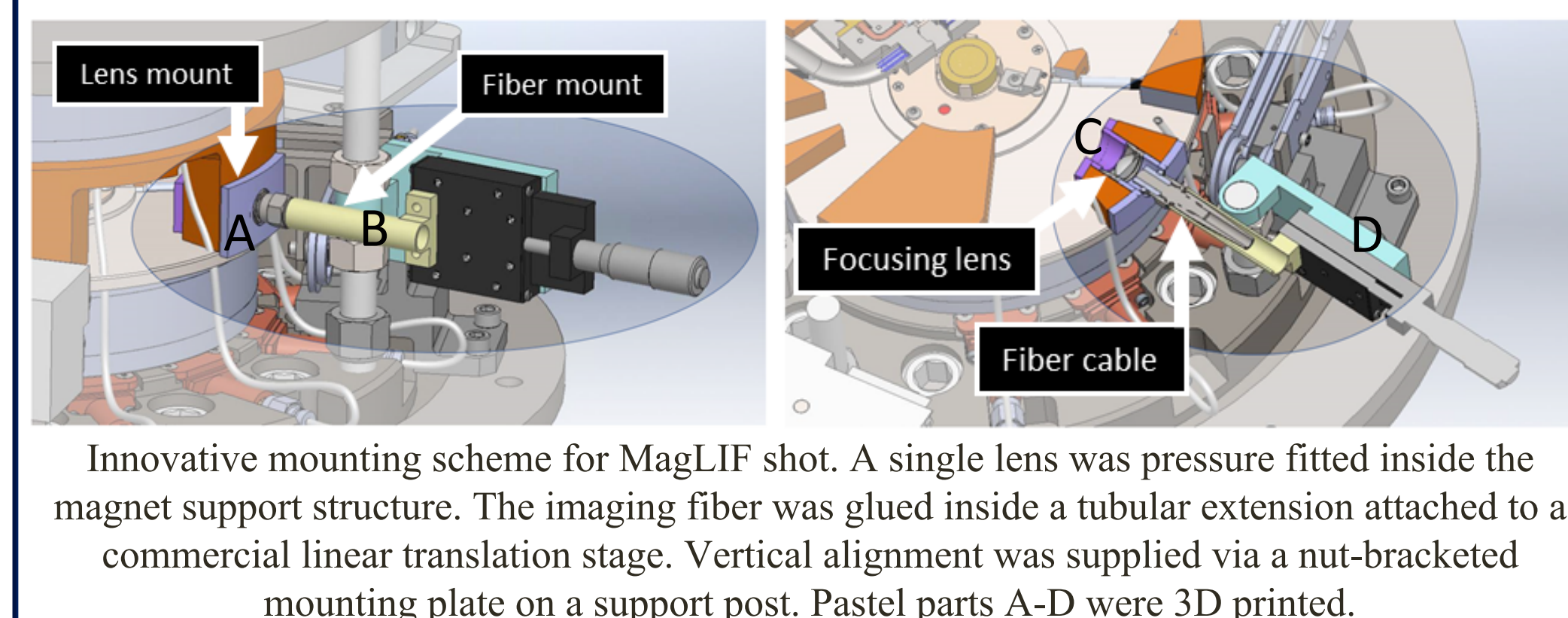


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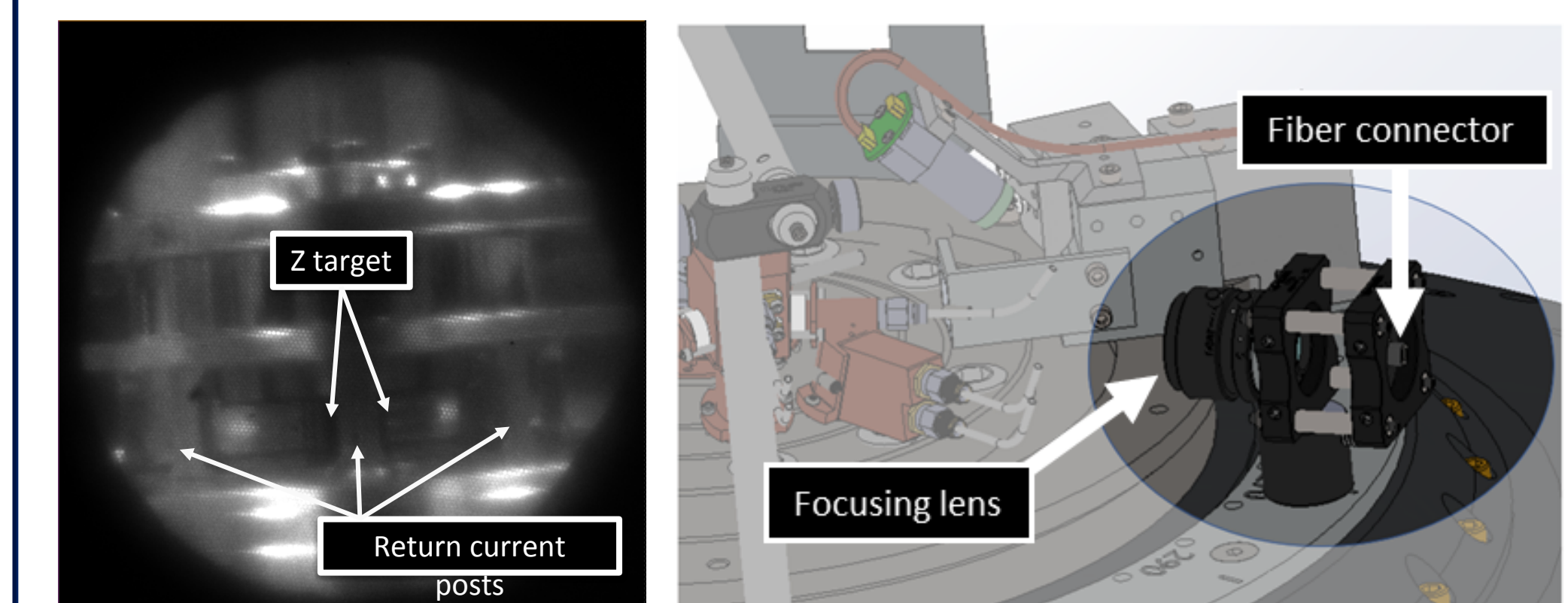


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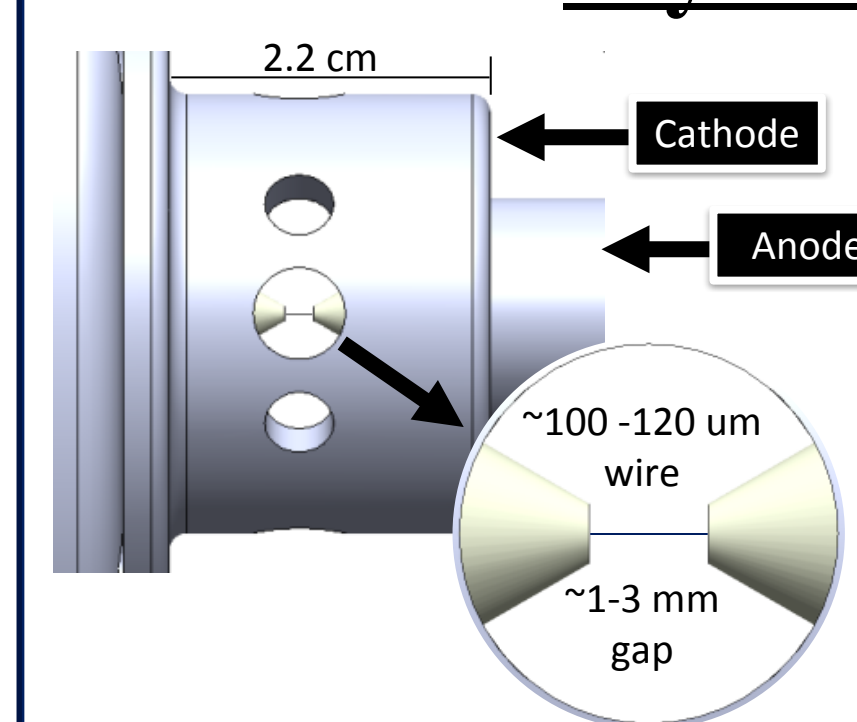


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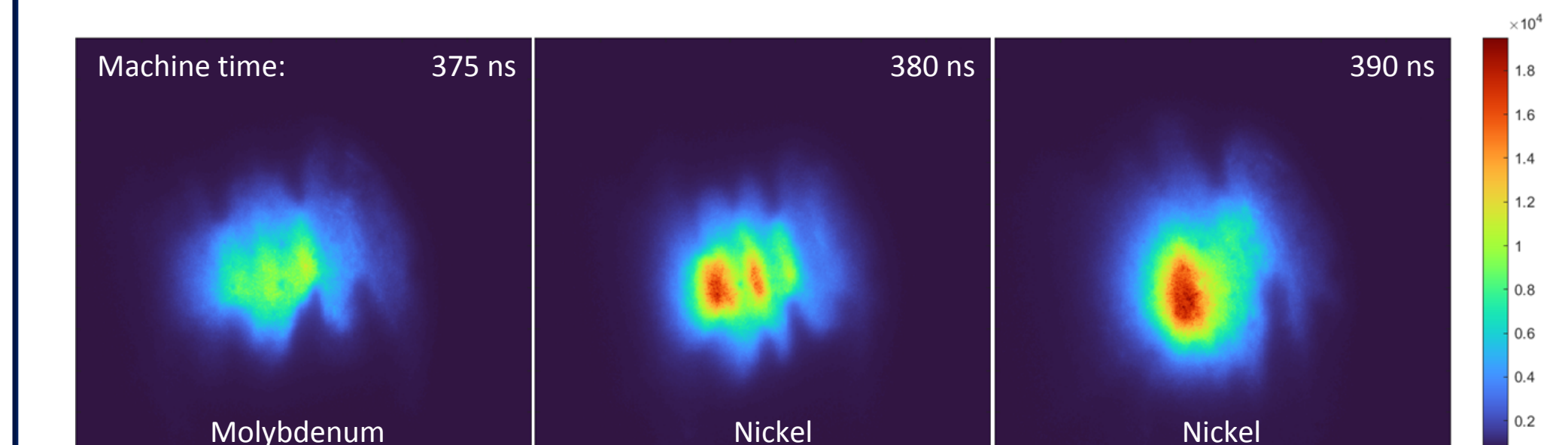
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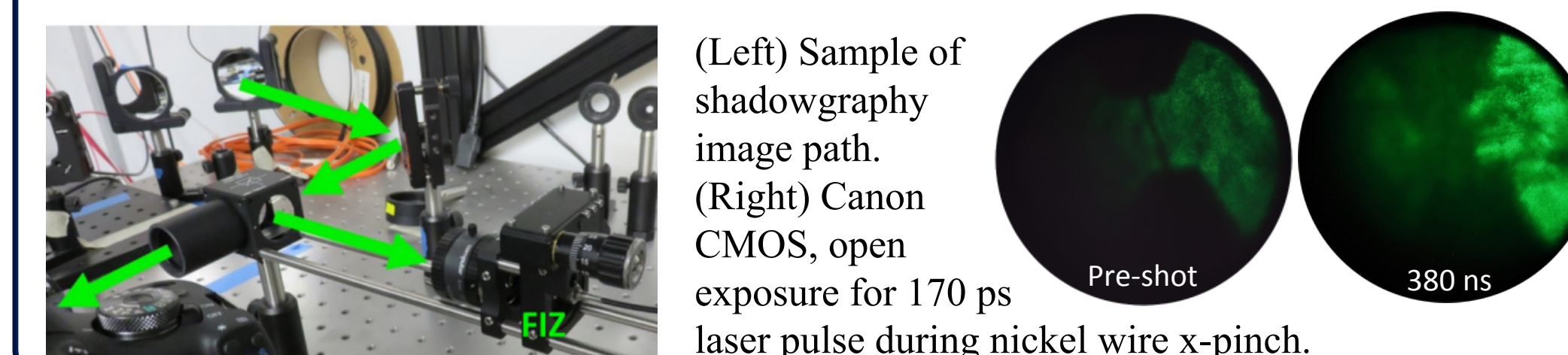
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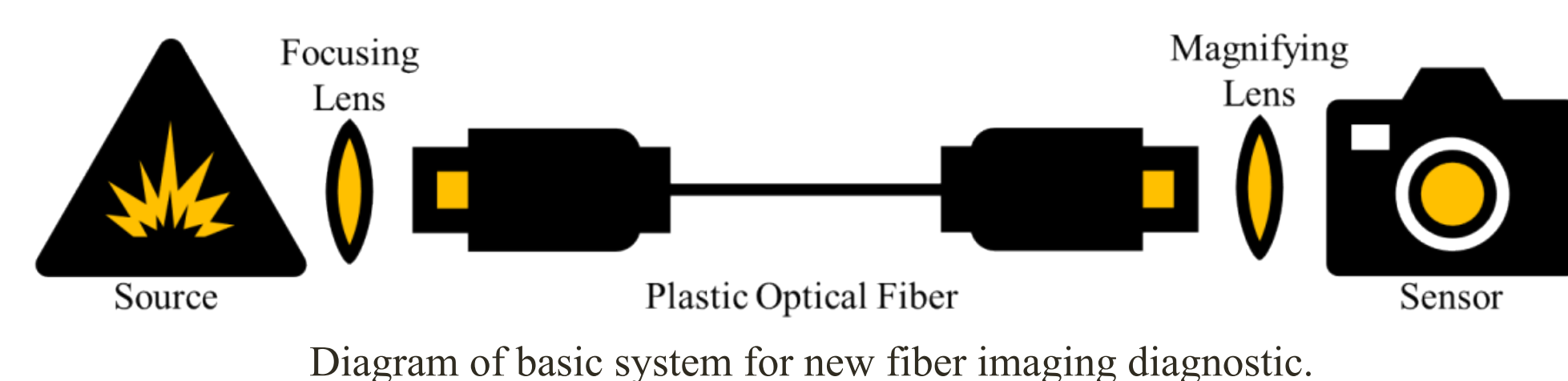
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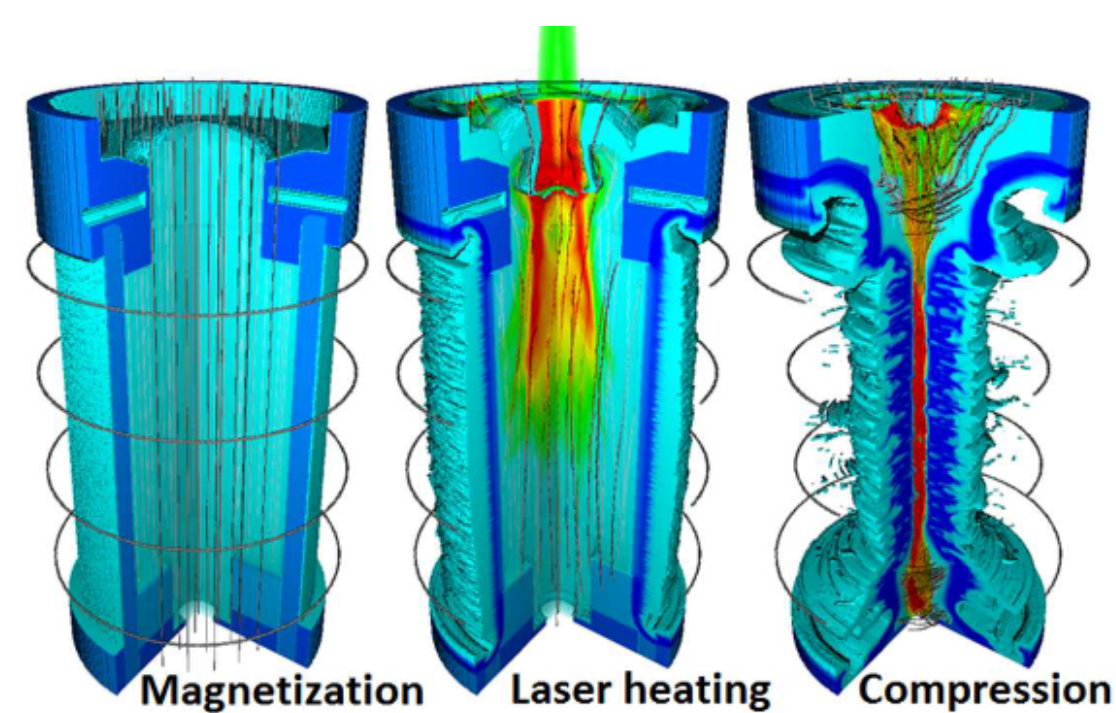
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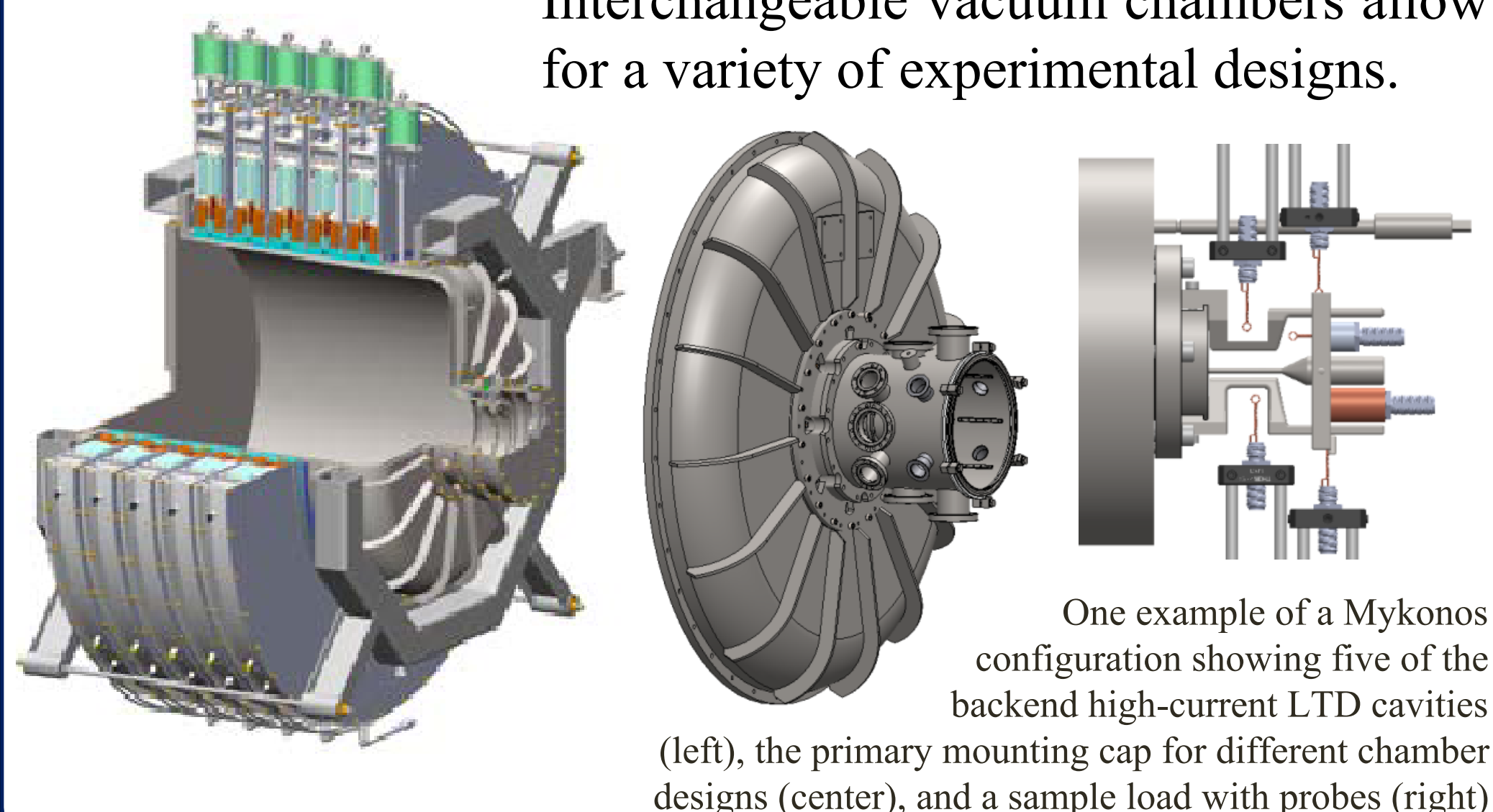
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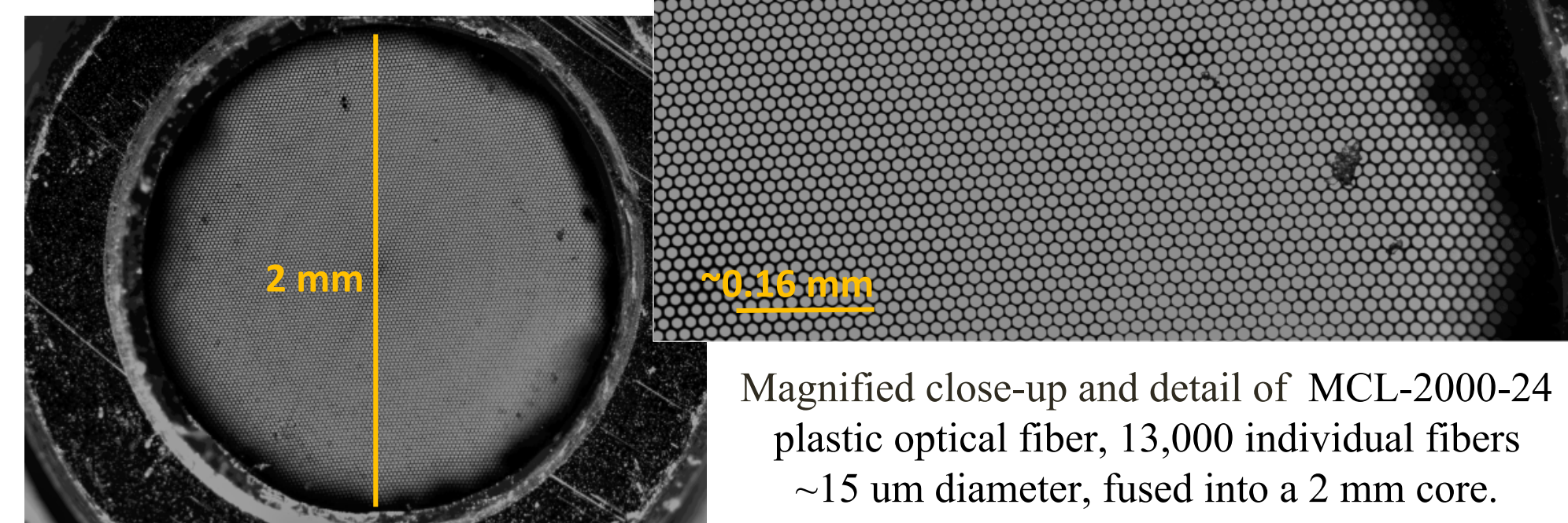
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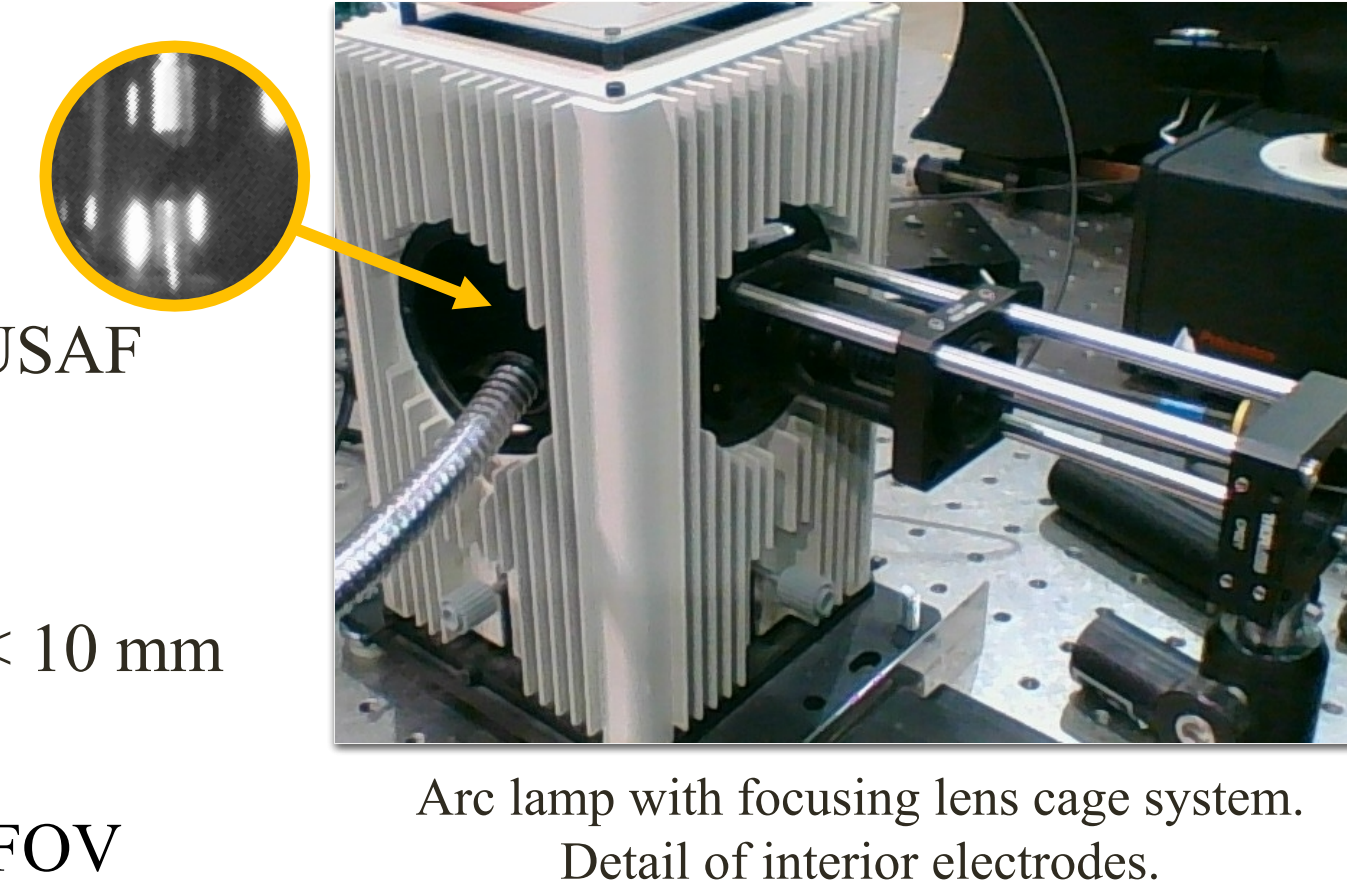
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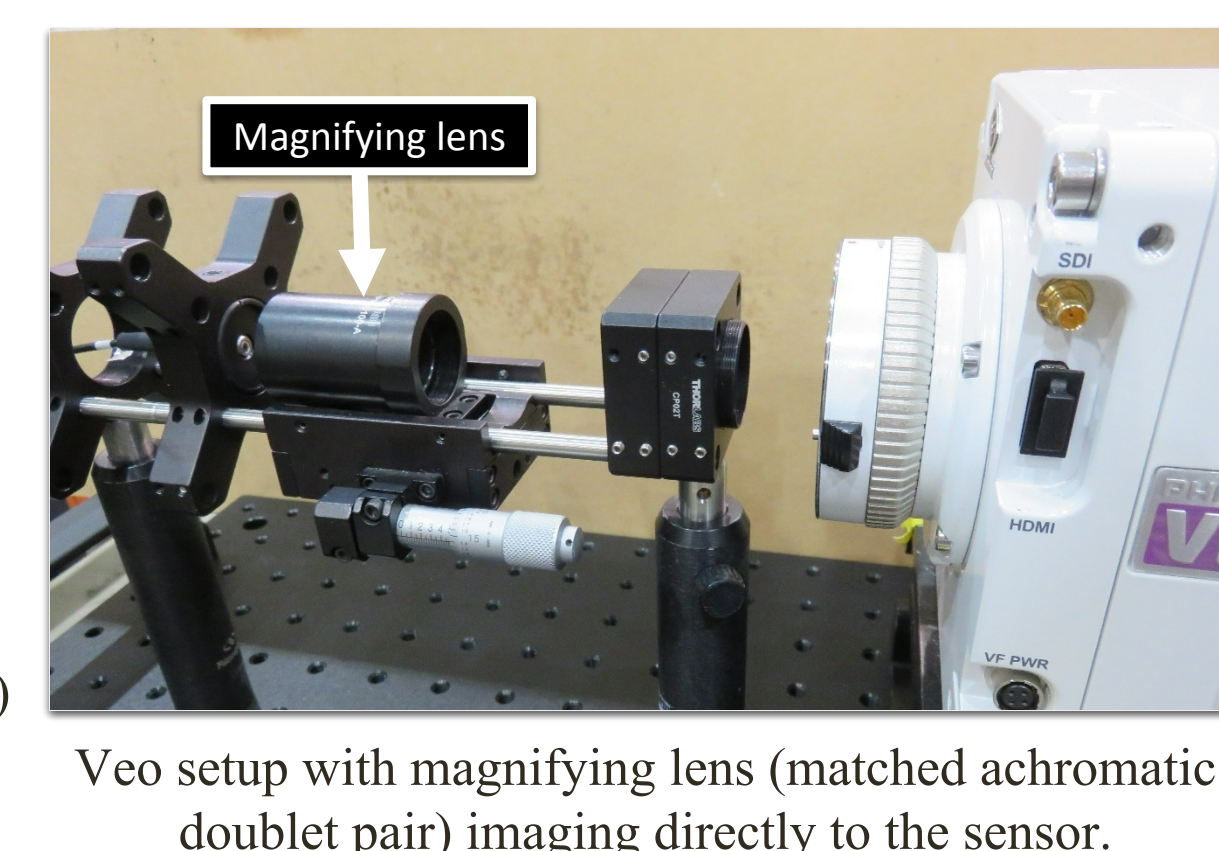
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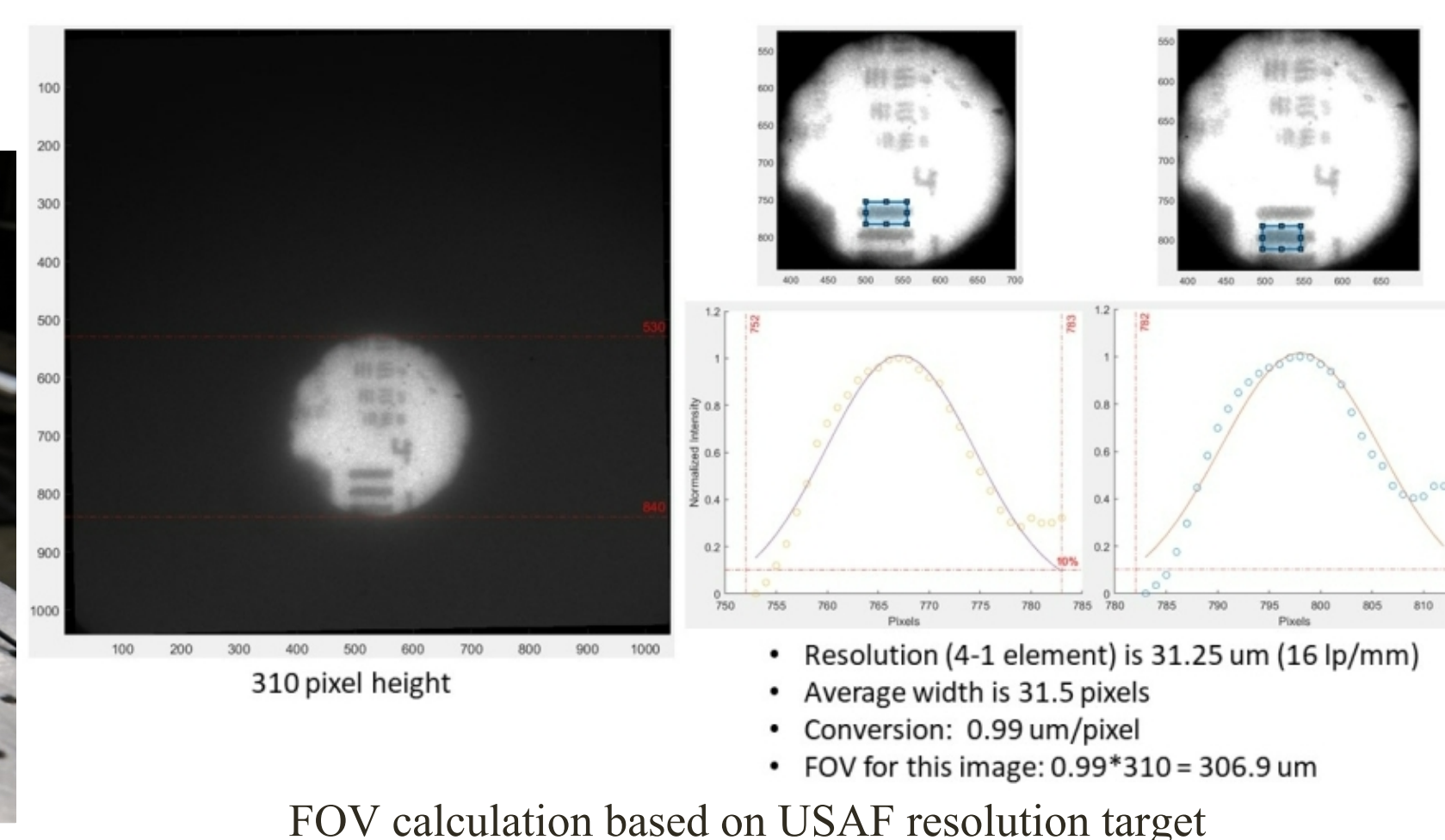
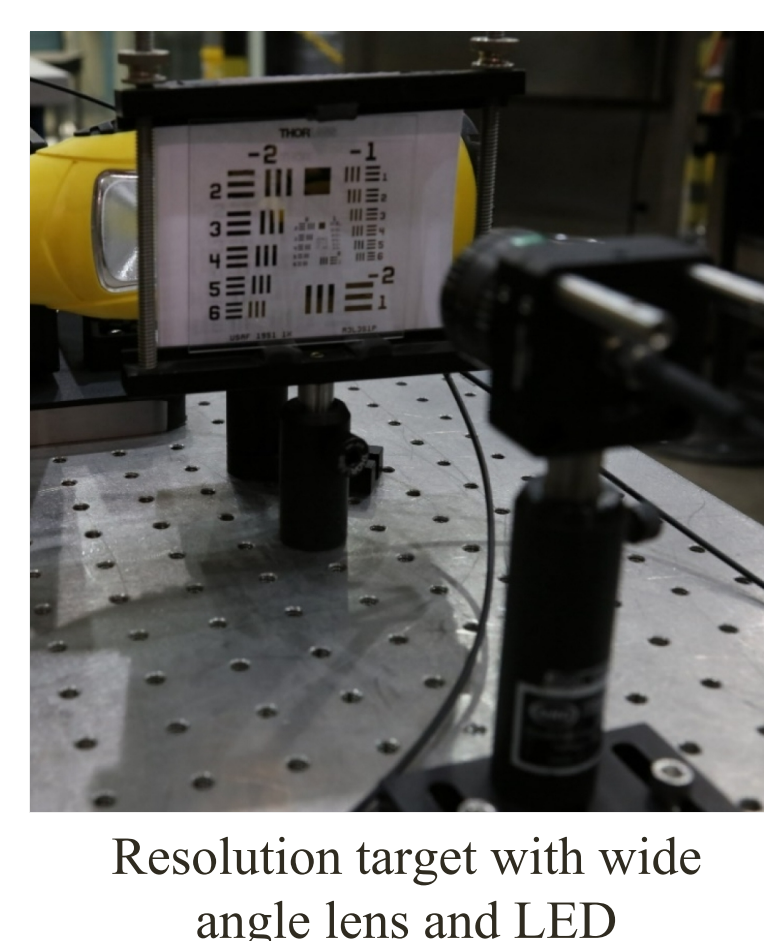
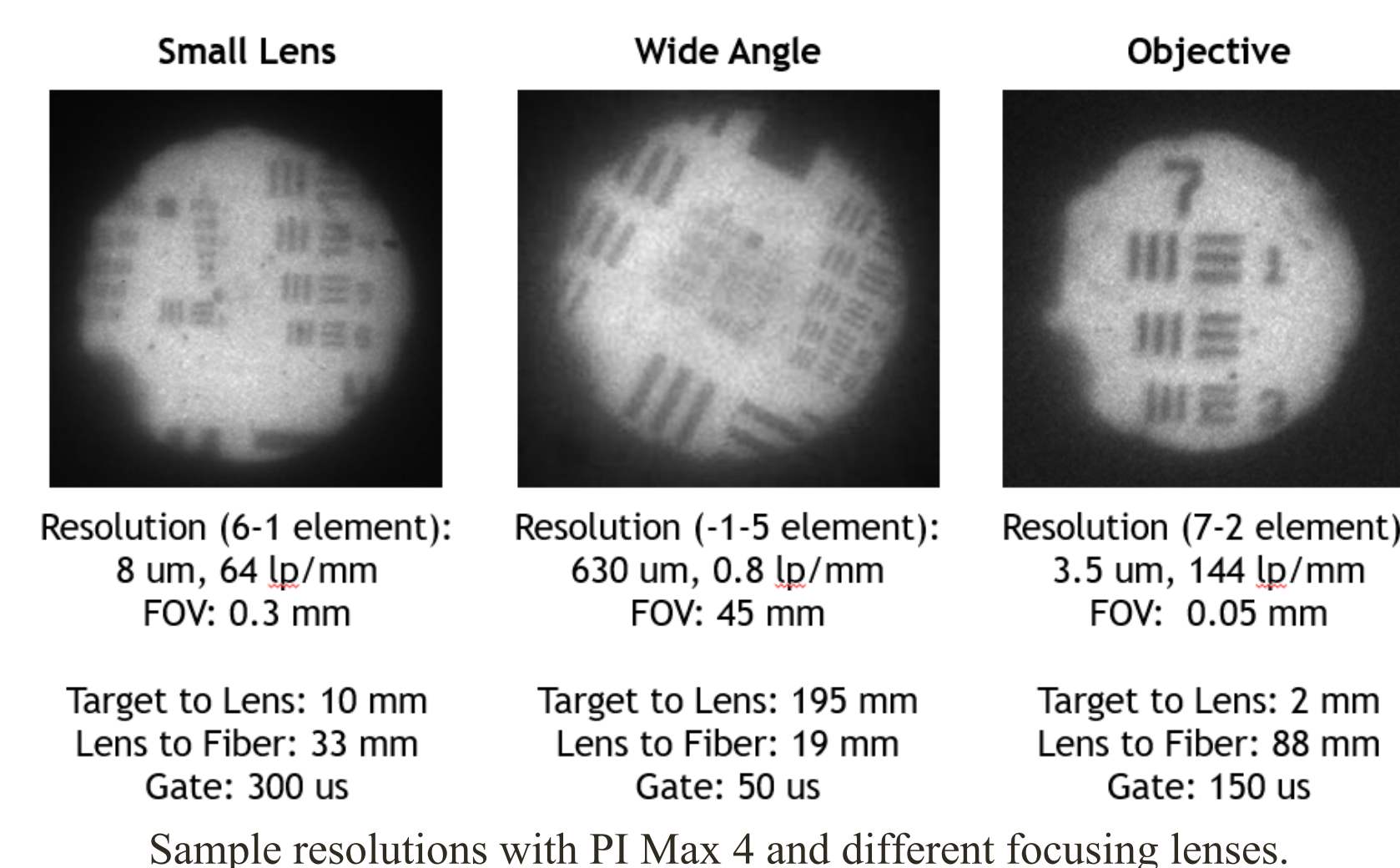


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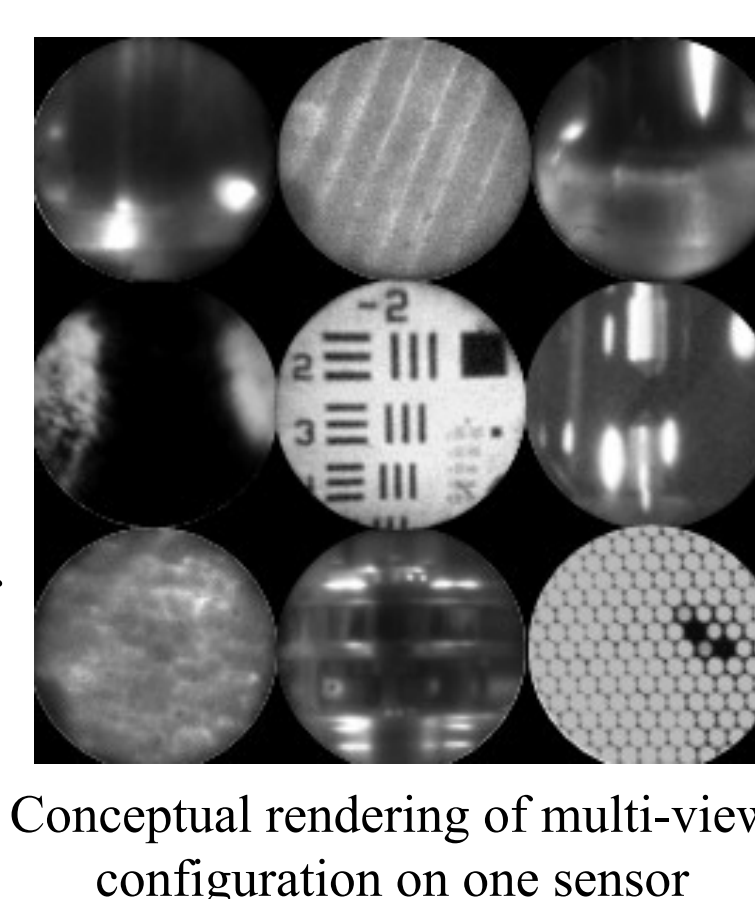


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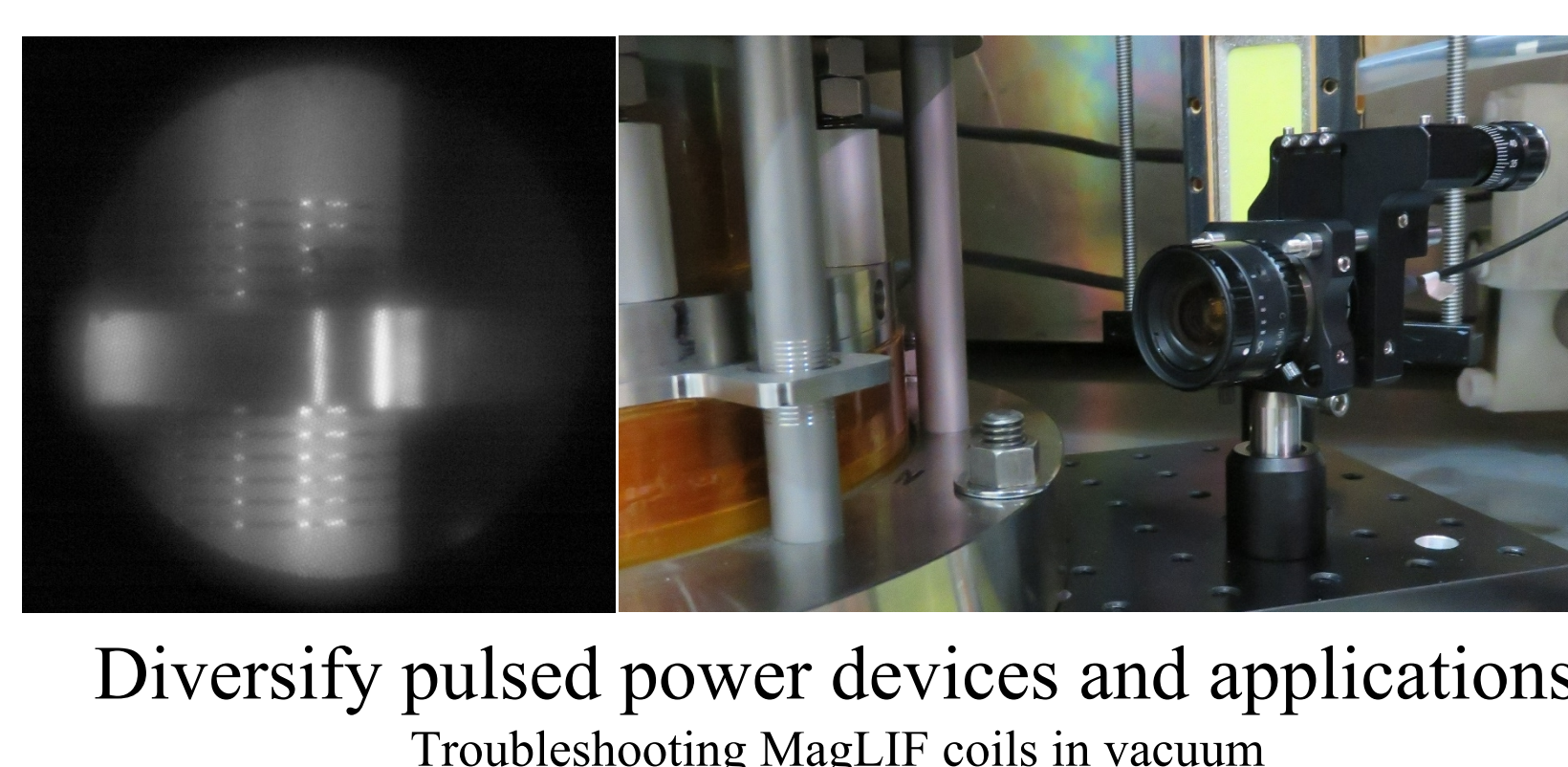


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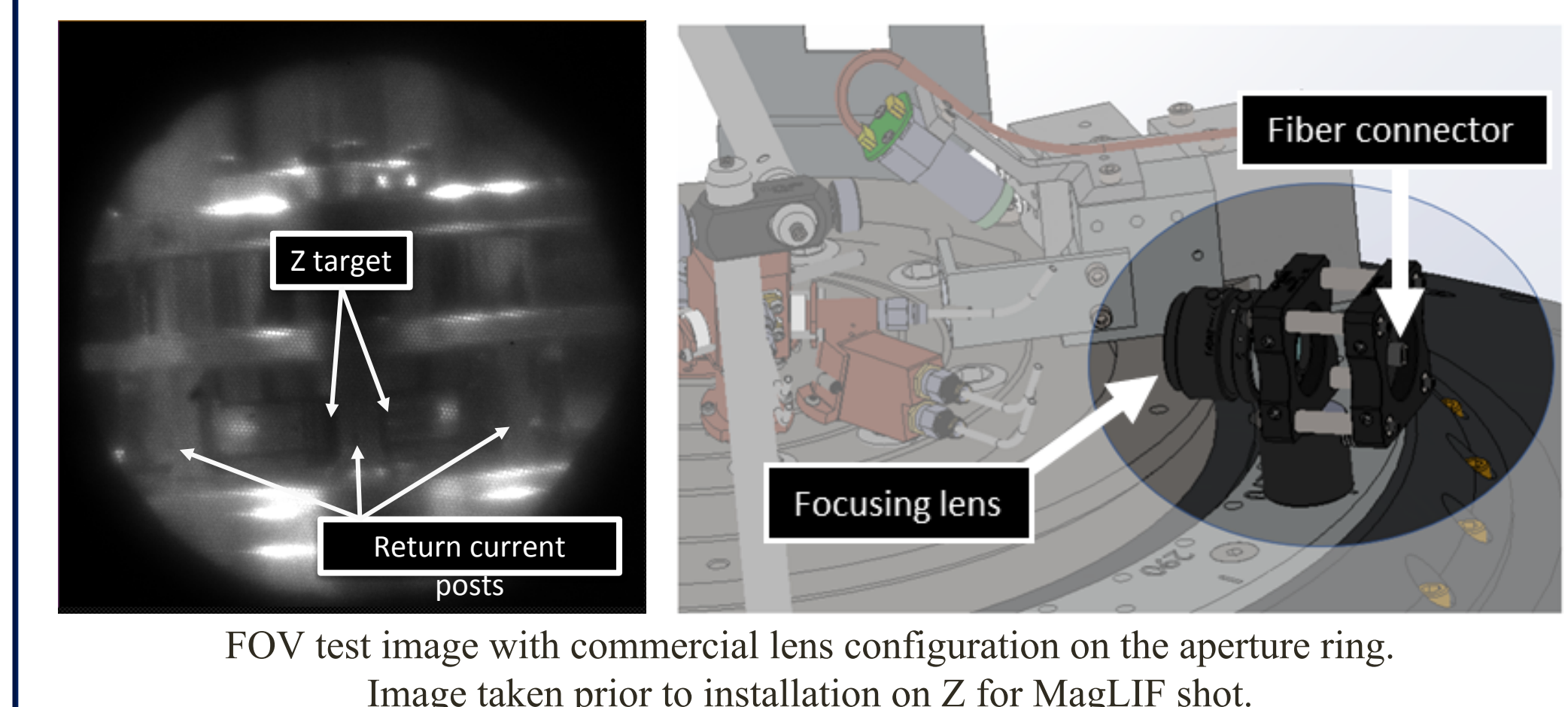
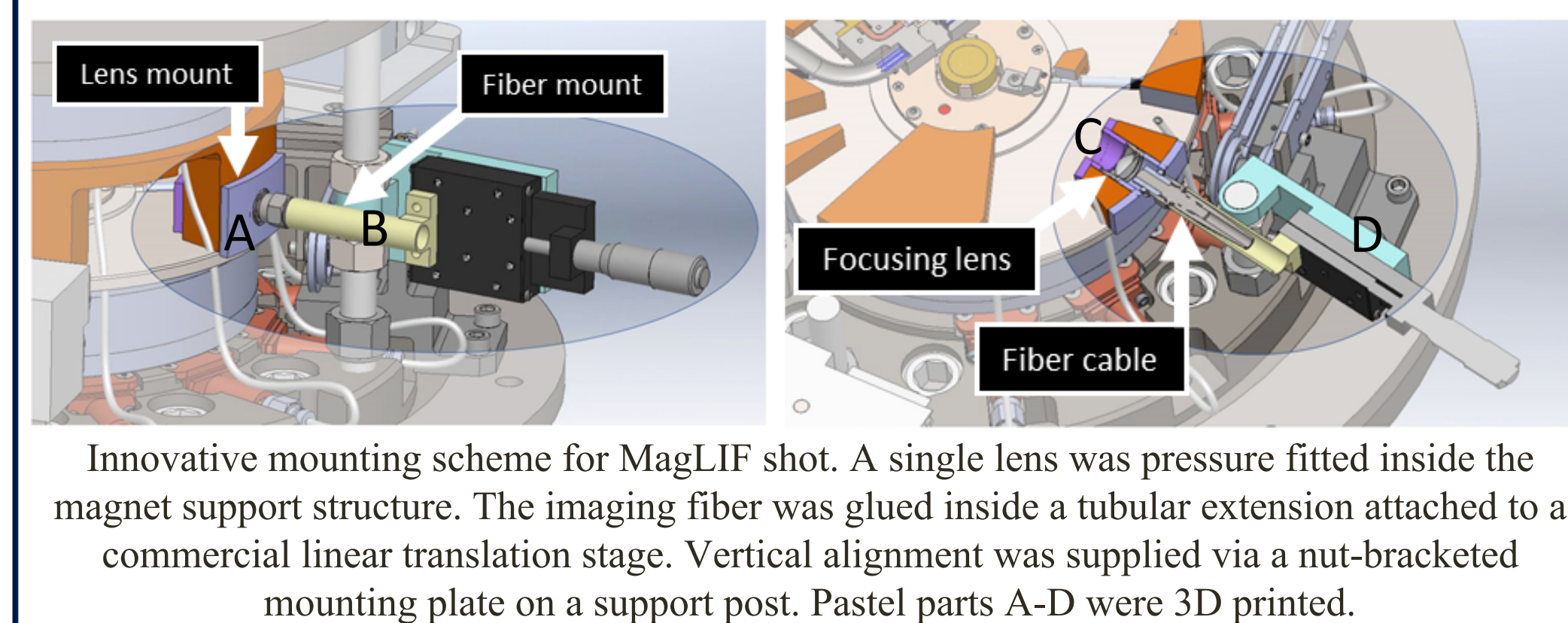


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