



NUCLEAR EMULSIONS: FROM PRODUCTION TO SCANNING

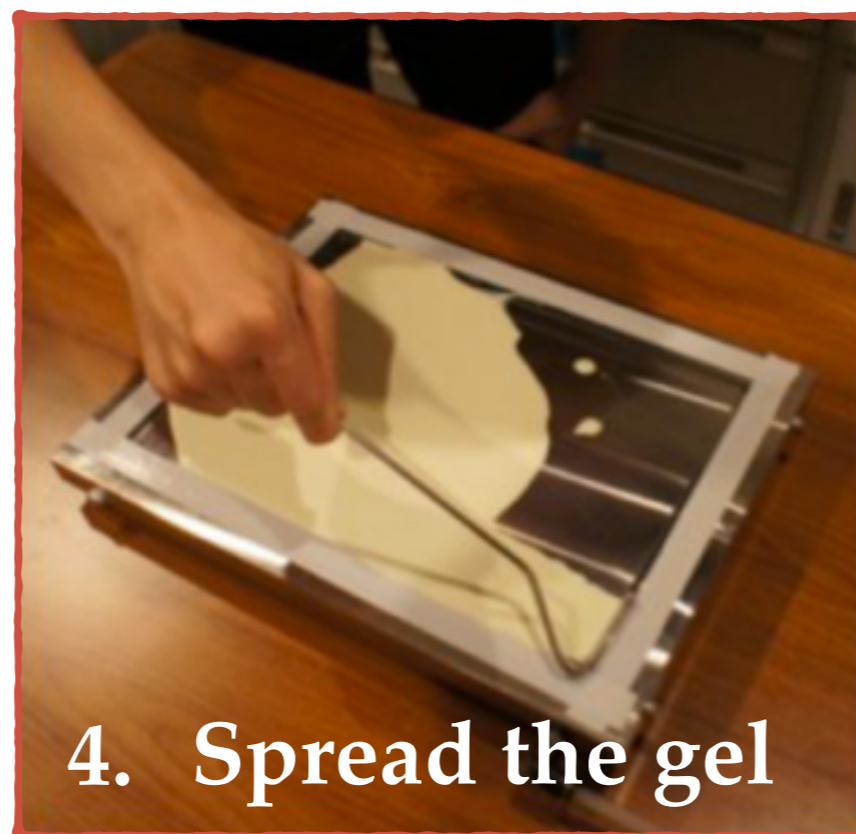
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EMULSION PRODUCTION PROCEDURE IN NAGOYA

Production @ Nagoya University (February 2019, 15 days)

1. Pour the gel (previously prepared) on a plastic base (70 cm x 30 cm)
2. Spread the gel in a very uniform way: check no air bubbles on the surface
3. Dry the gel at 28°C, 45% RH (about 24 hours)
4. Repeat points 3,4,5 on the other side of the plastic base
5. Cut the foil in 10 cm x 12.5 cm emulsions
6. Repeat 1-5 for 30 plastic bases



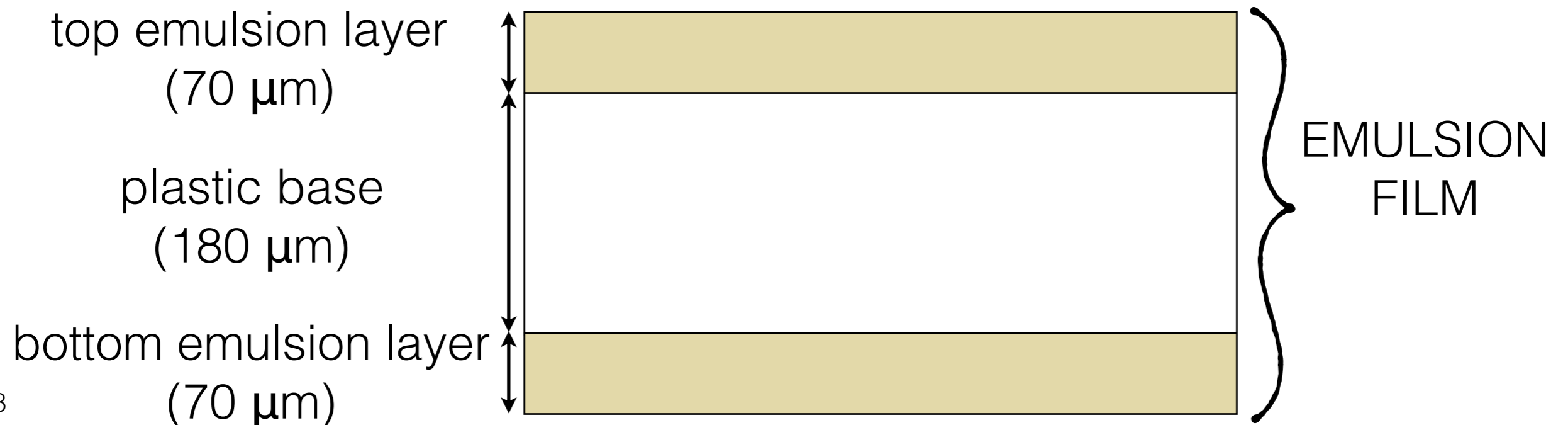
EMULSION PRODUCTION

Production @ Nagoya University

- ▶ 400 emulsions (10x12.5 cm²) were produced in Nagoya

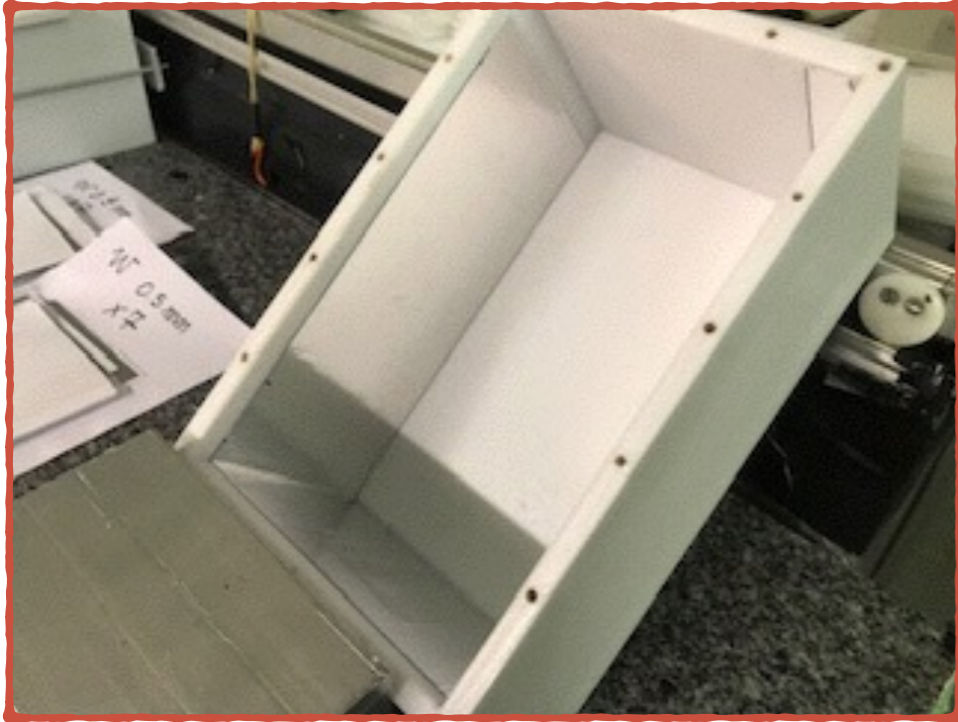
Production @ Slavich

- ▶ 120 emulsions (10x12.5 cm²) were produced from Russian factory Slavich
- ▶ delivered to CERN



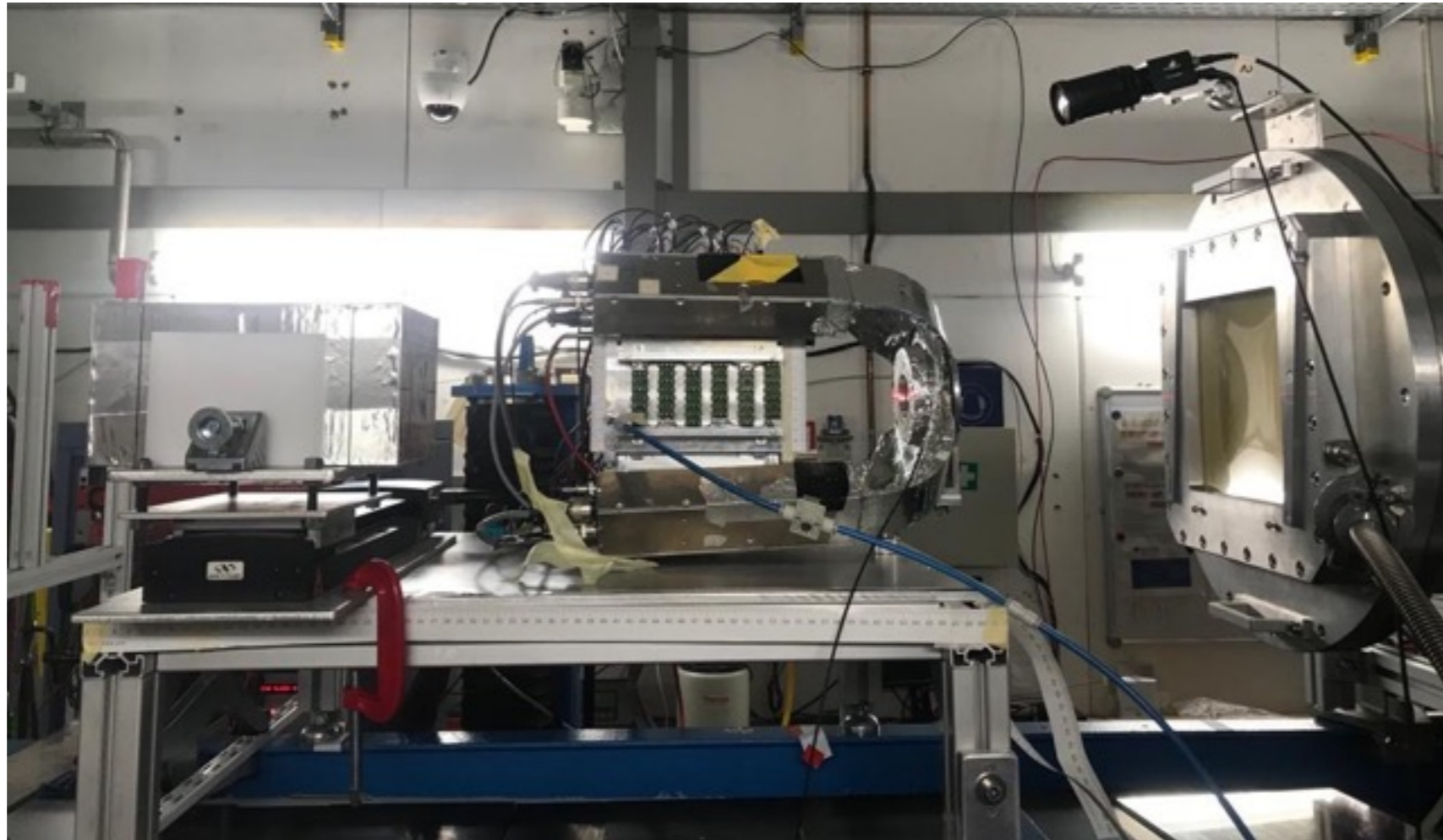
EMULSION ASSEMBLY @ CERN

- ▶ 4 ECC were assembled at CERN
- ▶ 2 ECC with C target and 2 ECC with C₂H₄ target



ECC EXPOSURE

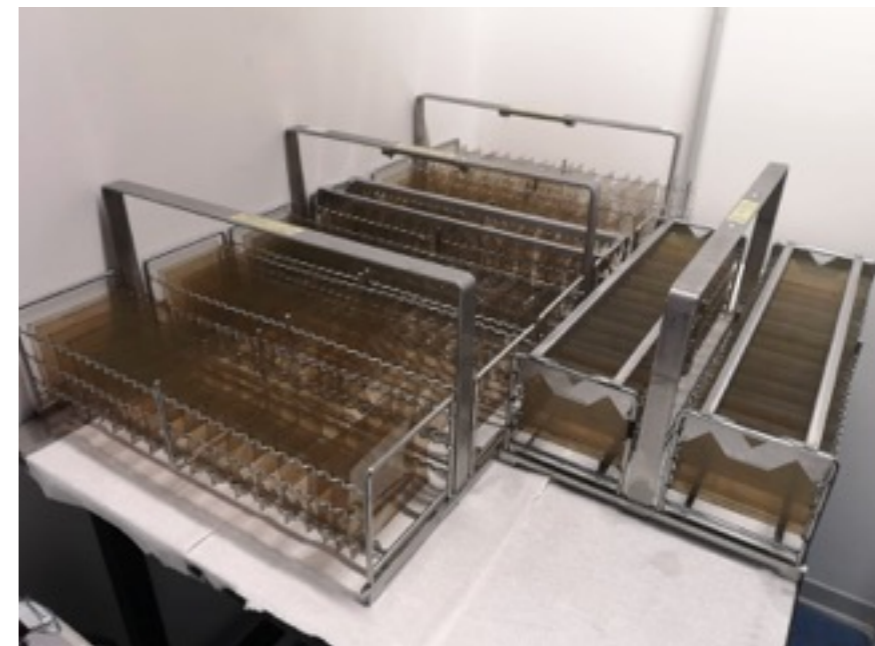
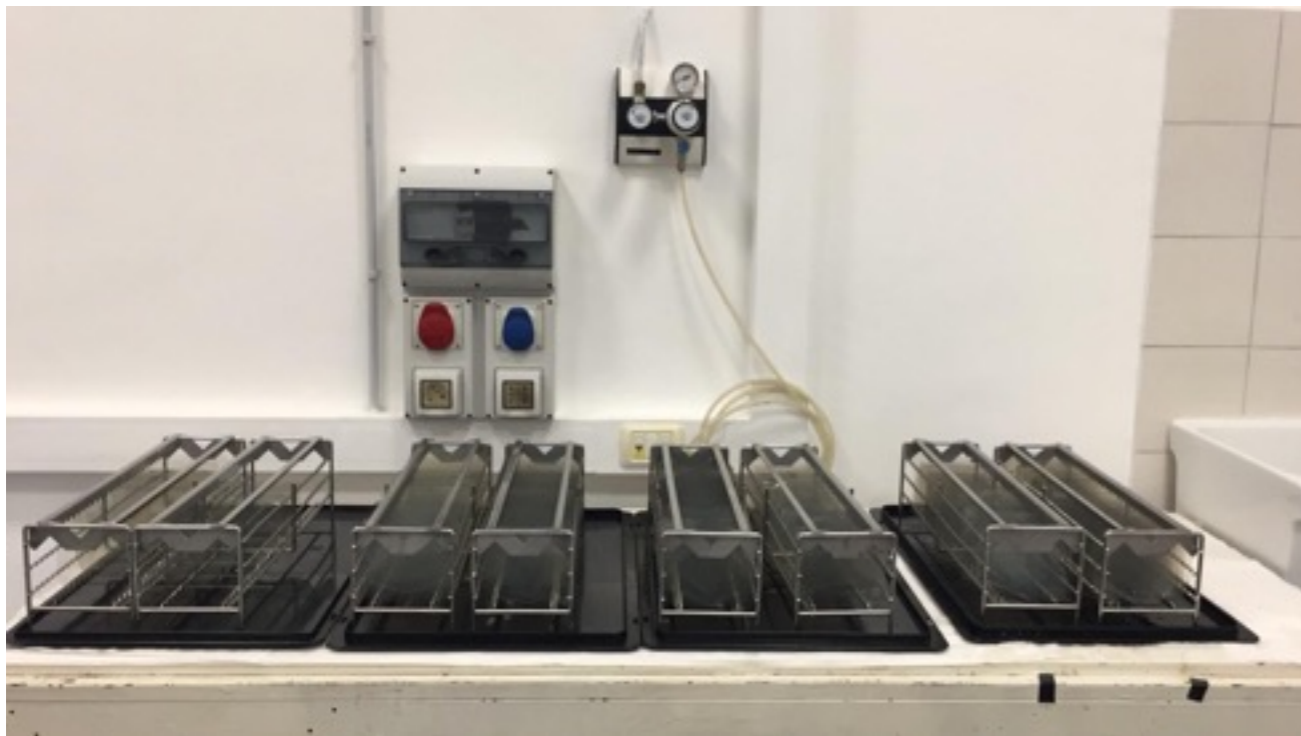
- ▶ 4 ECC were exposed at GSI



	O ₁₆ (200 MeV/n)	O ₁₆ (400 MeV/n)
Carbon	GSI1	GSI3
Polyethylene	GSI2	GSI4

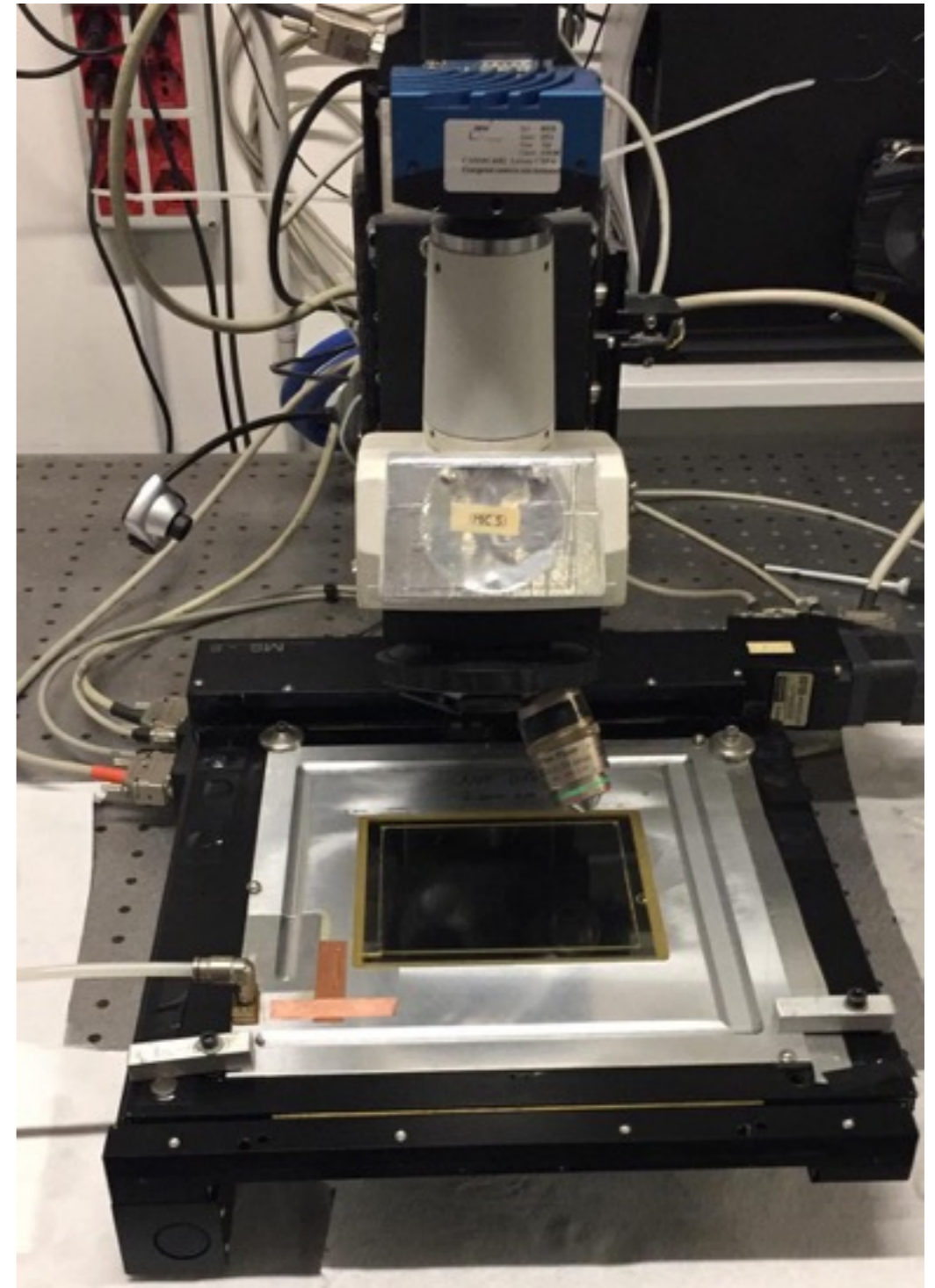
EMULSIONS DEVELOPMENT

- ▶ 400 emulsions were developed in Naples in new dark room facility
- ▶ 120 emulsions (section 2) were thermally treated and developed in GS facility, then brought to Naples
- ▶ All emulsions were cleaned from silver residuals and were treated with glycerine in order to minimize distortions and other problems due to the development and drying processes



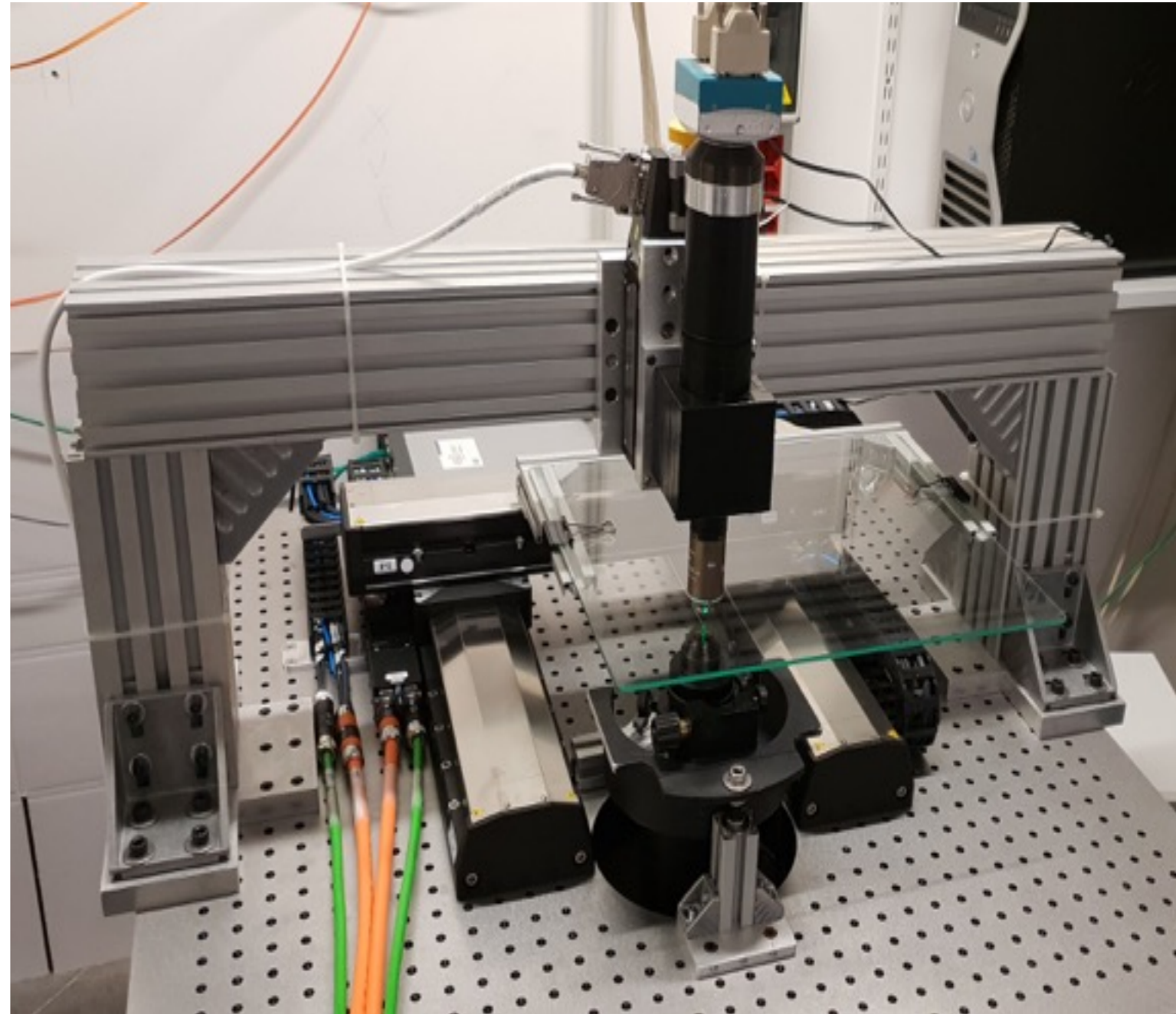
EMULSIONS SCANNING

- ▶ Scanning began on 7th May
- ▶ One dedicated microscope in Naples
- ▶ Scanning parameter optimization on-going
- ▶ 30 emulsions (GSI2, section 1) have been already scanned



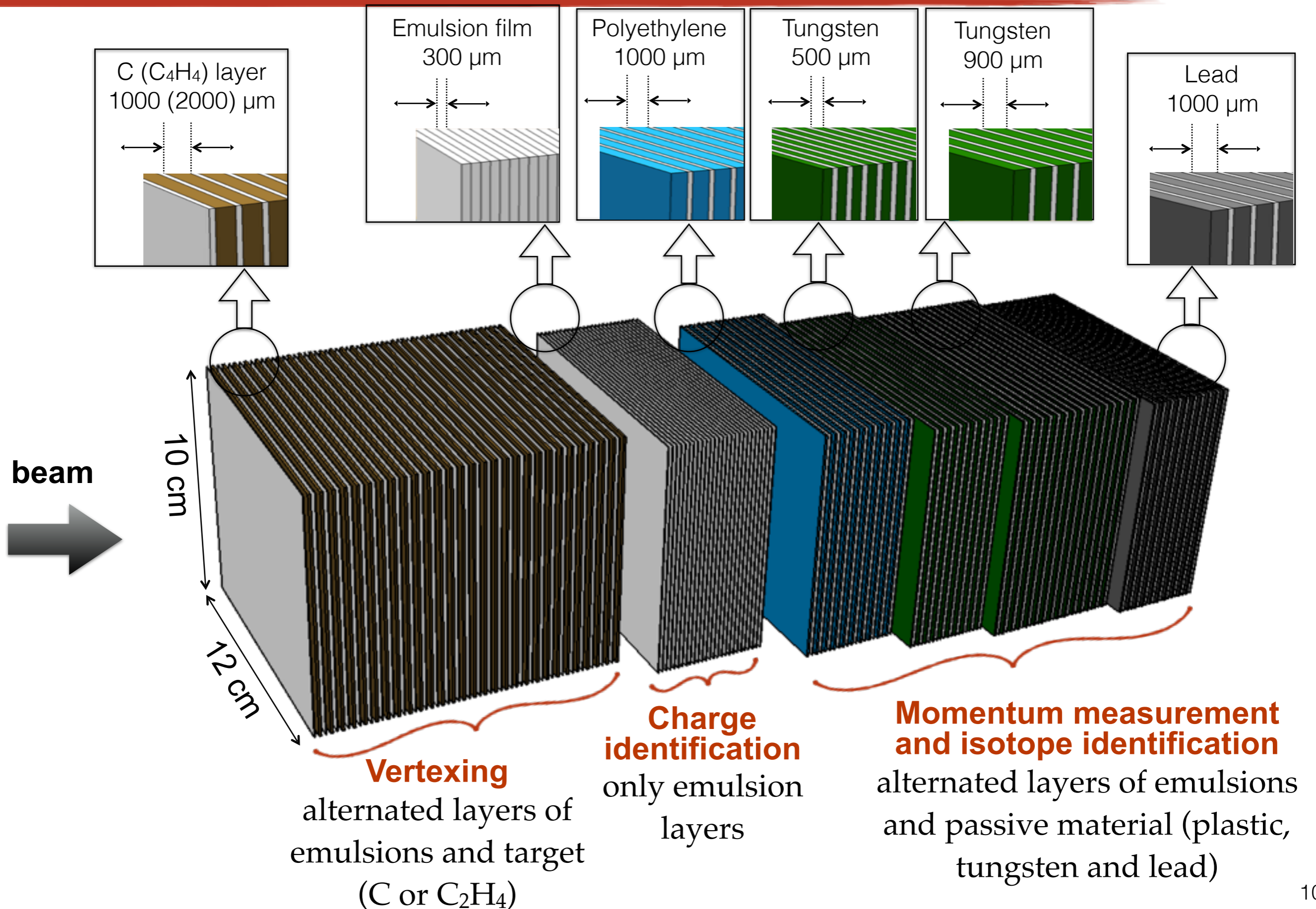
NEW MICROSCOPE

- ▶ large area
- ▶ high speed (up $190 \text{ cm}^2/\text{h}$)
- ▶ hardware assembled
- ▶ software parameter optimization on-going



BACK UP SLIDES

EMULSION SPECTROMETER DESIGN



DETECTOR STRUCTURE

	Oxygen 200 MeV/n	Oxygen 400 MeV/n
S1	C (30x1mm) / C2H4 (30x2mm) + 29 emu	
S2	Emu (36)	
S3	Polyethylene (10x1mm)+10emu	
S4	W (10x0.5mm)+10emu	
S5	W (15x0.9mm)+15emu	
S6	Pb (20x1mm)+20emu	Pb (40x1mm)+40emu

The diagram illustrates the detector structure for two different oxygen beam energies. The layers are labeled S1 through S6. For the 200 MeV/n beam, the layers are S1, S2, S3, S4, S5, and S6. For the 400 MeV/n beam, the layers are S1, S2, S3, S4, S5, and S6. The S6 layer is thicker for the 400 MeV/n beam.