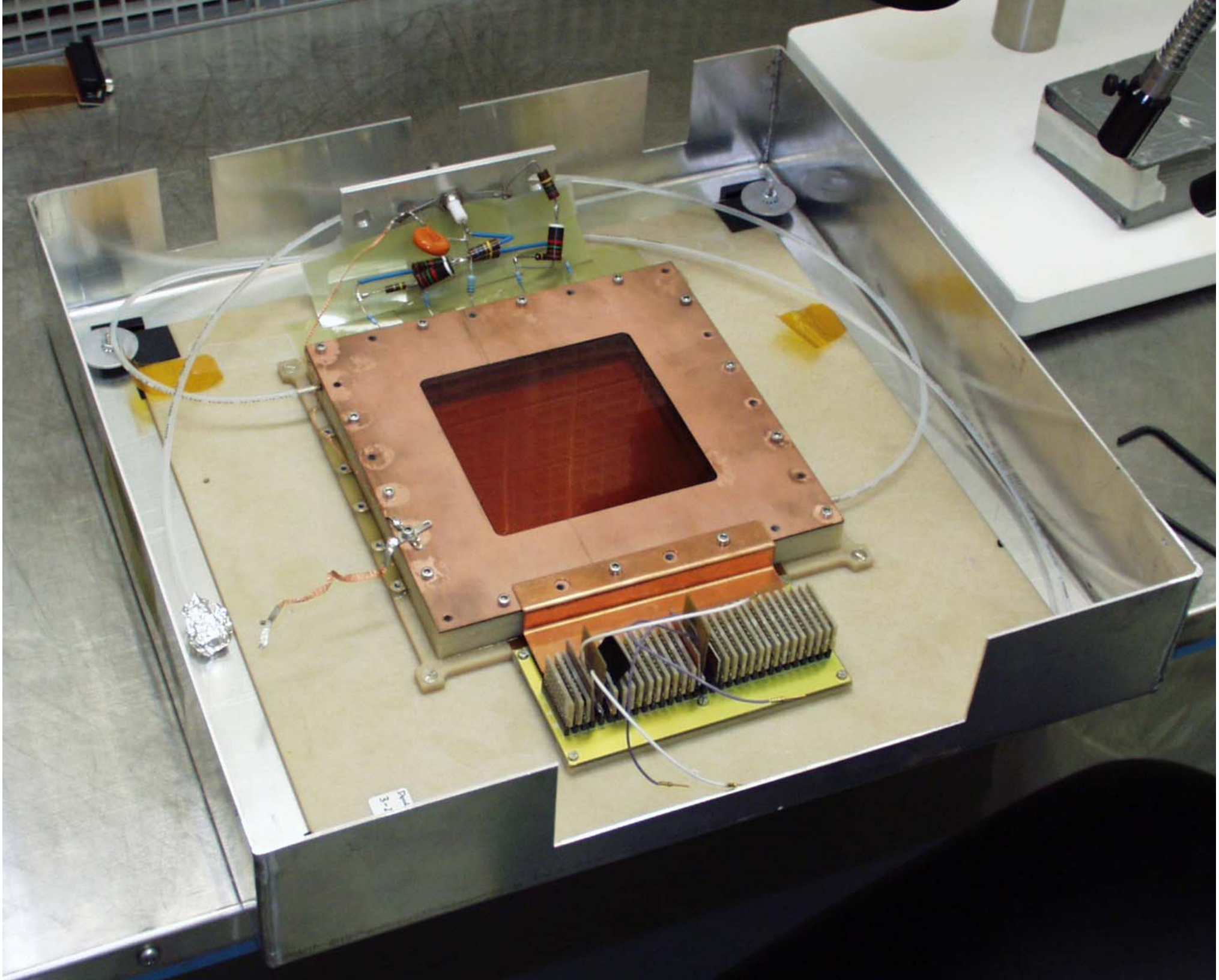
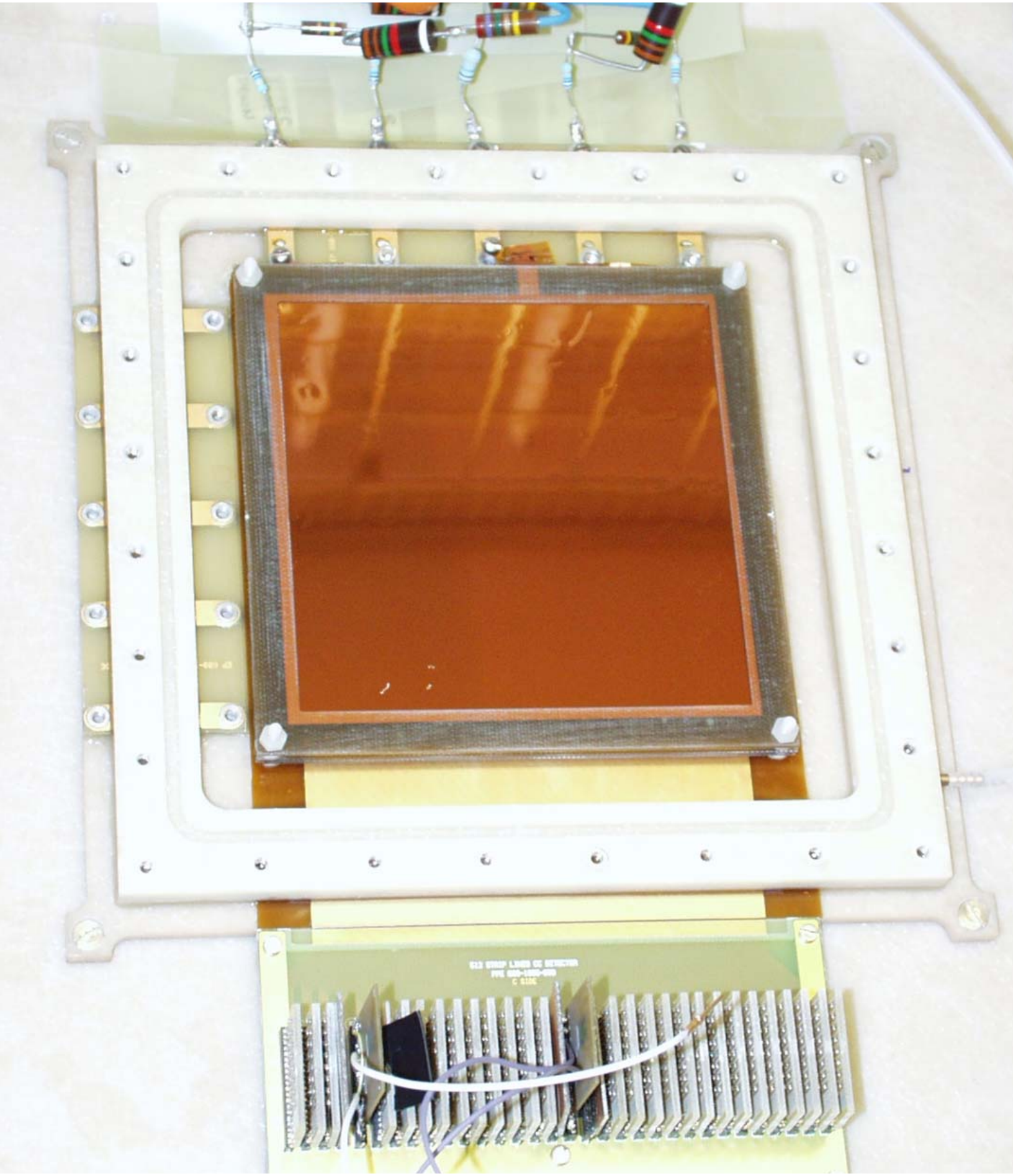
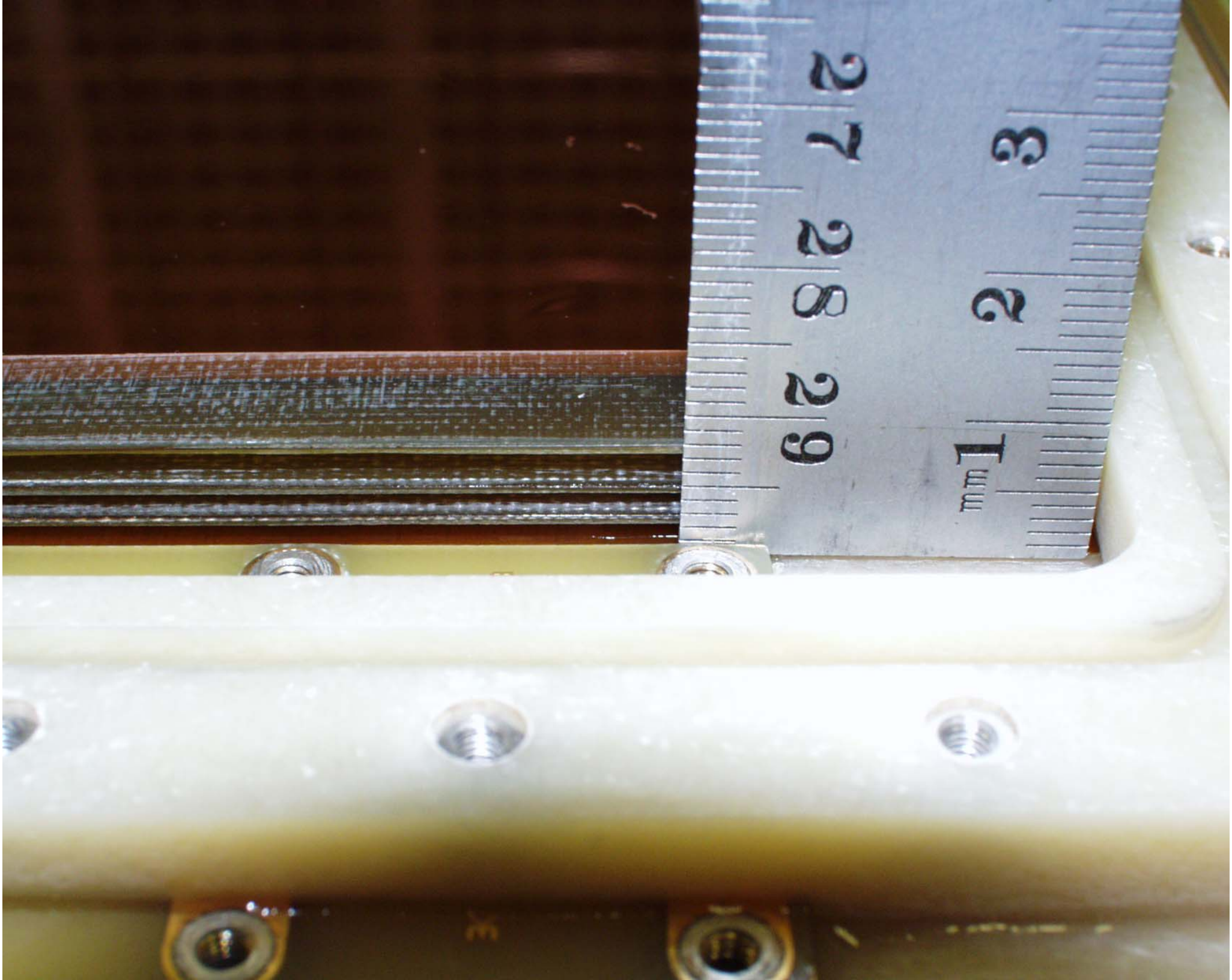
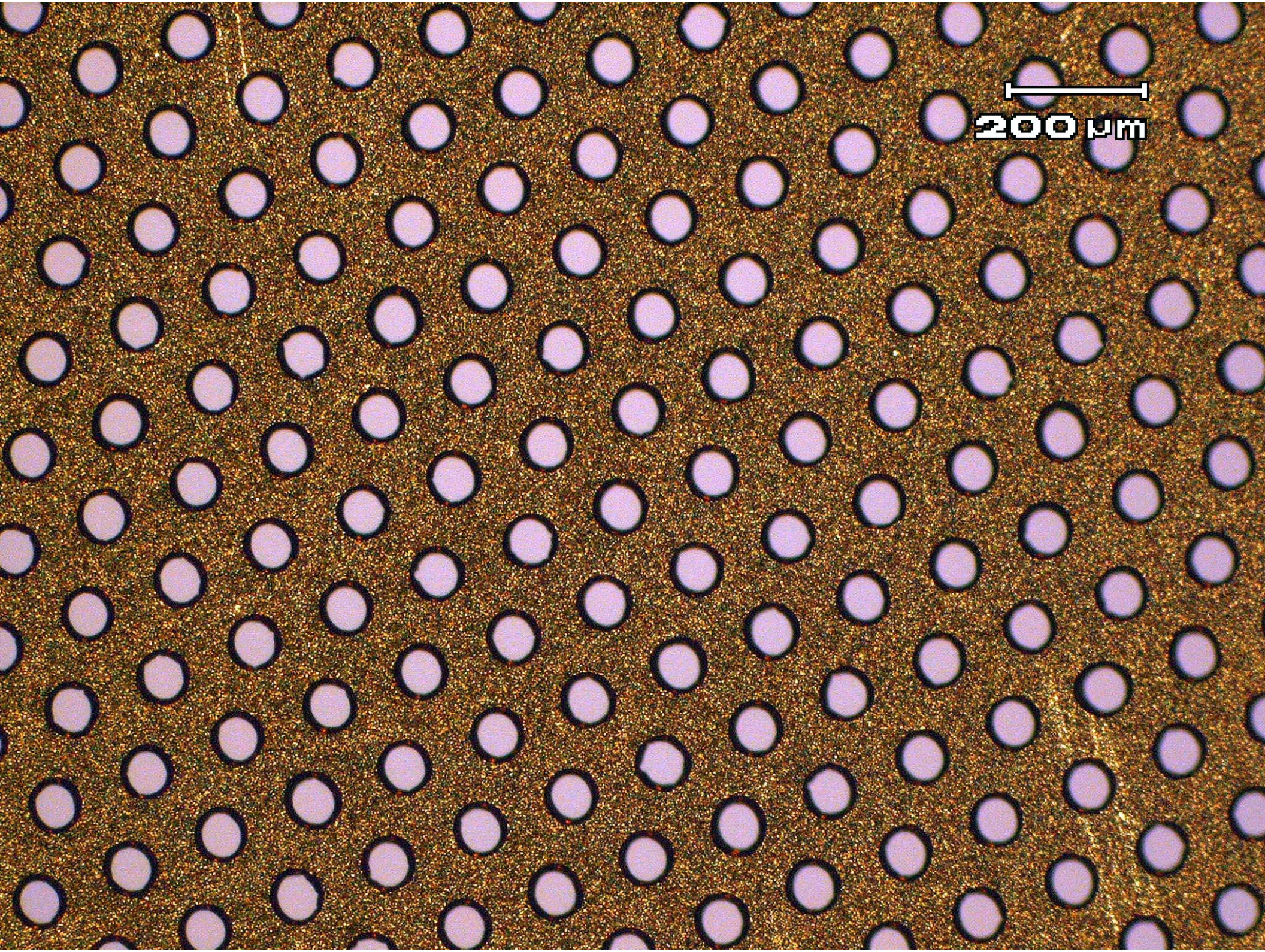
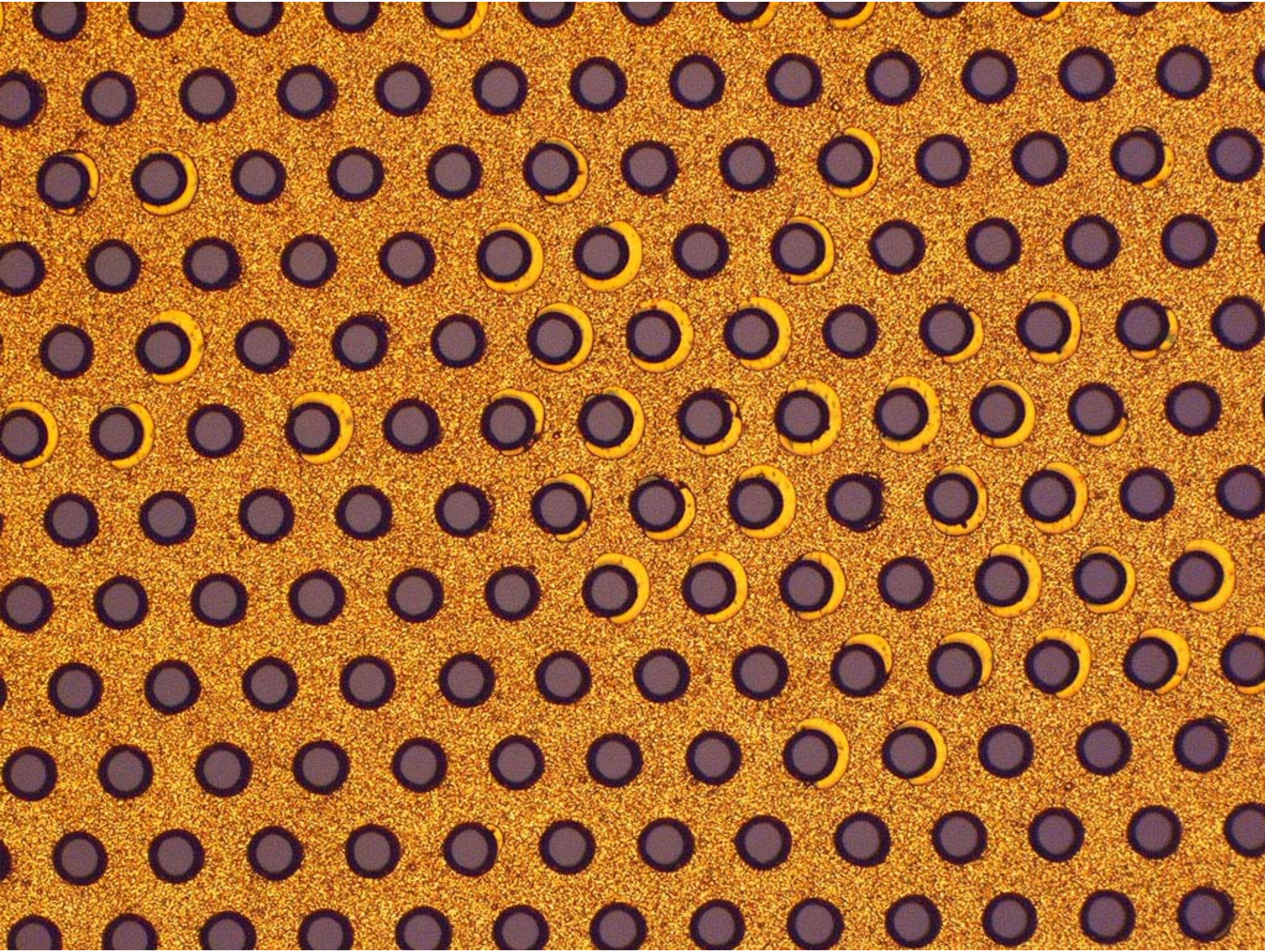
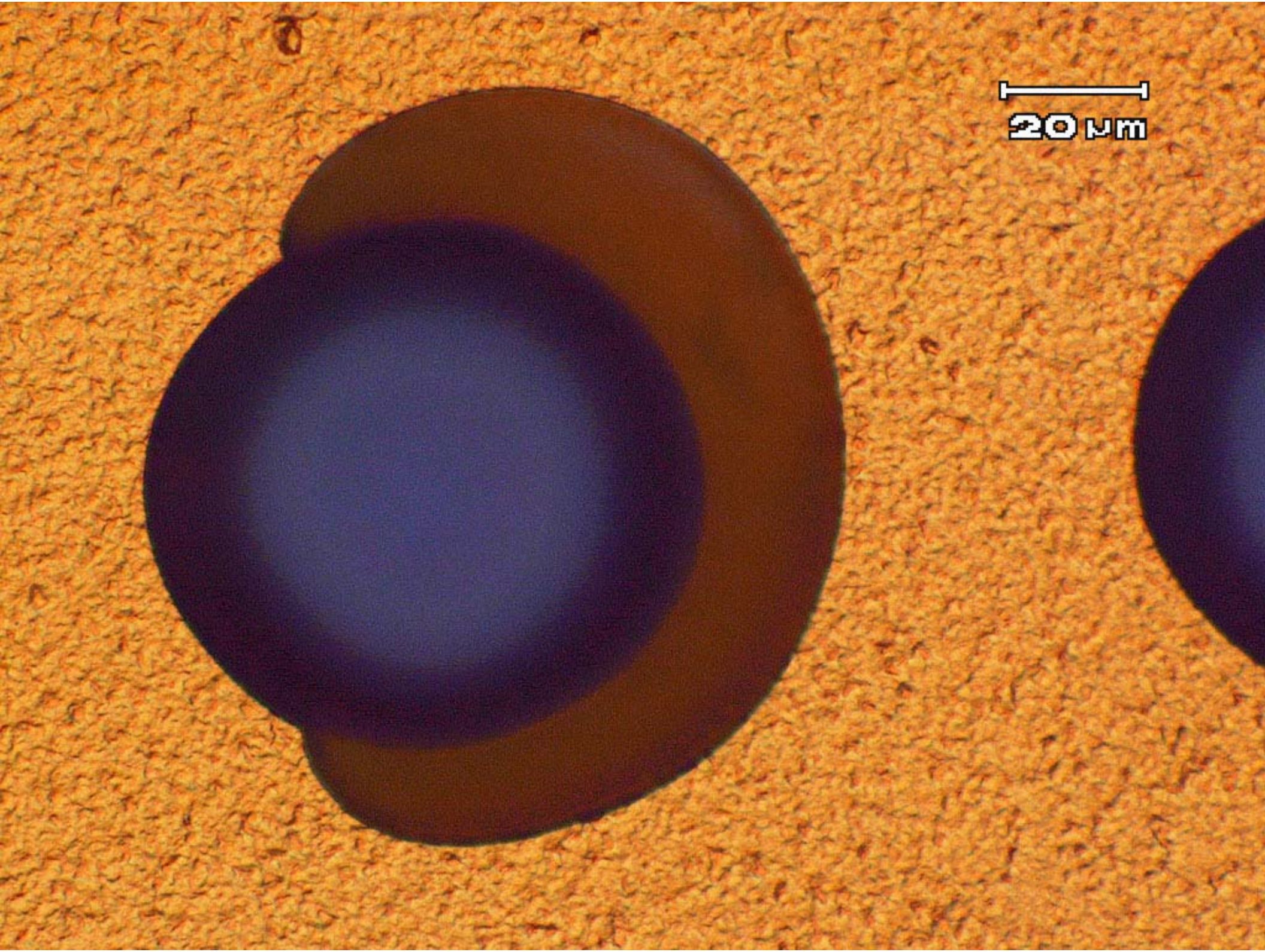


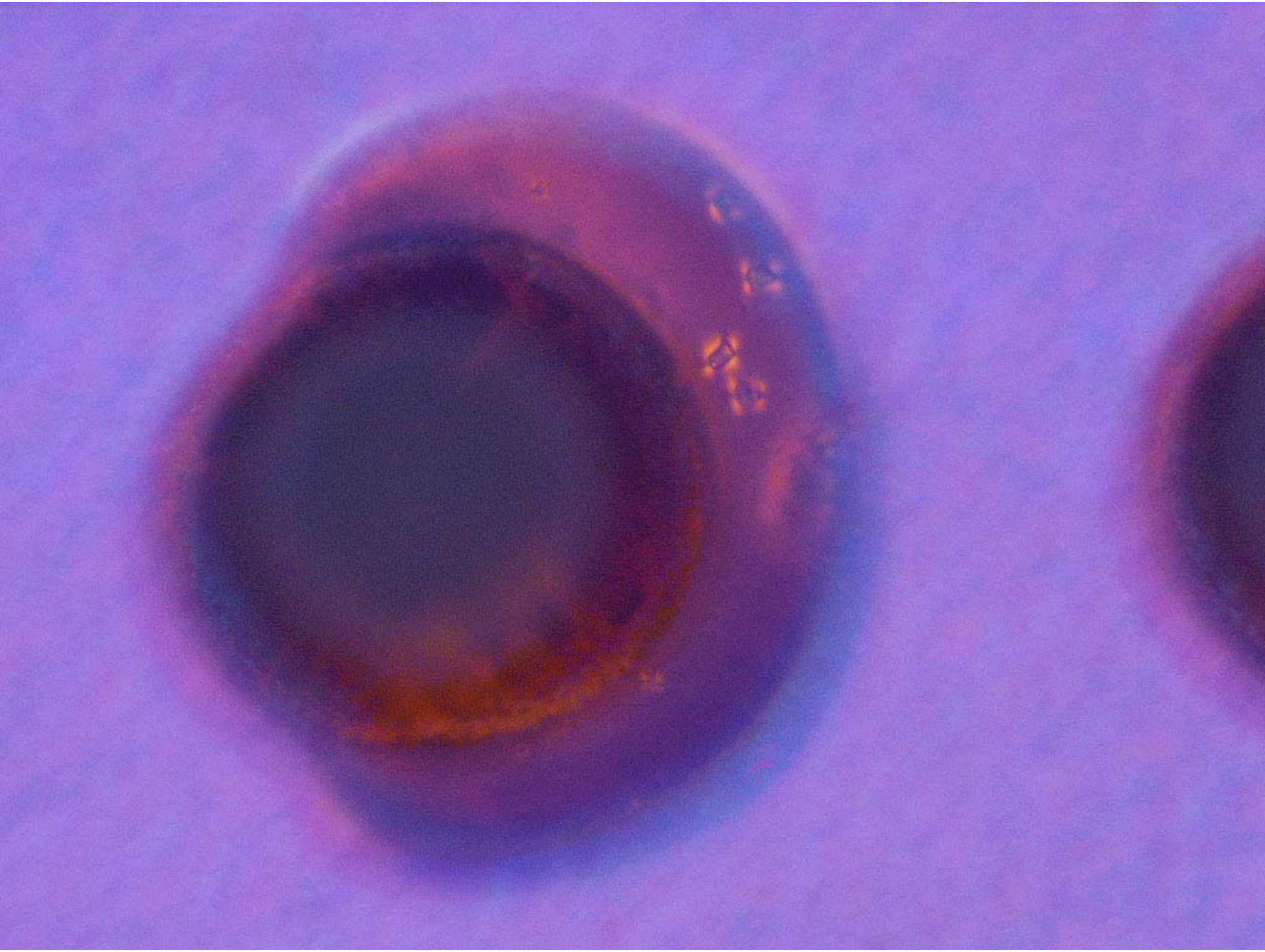


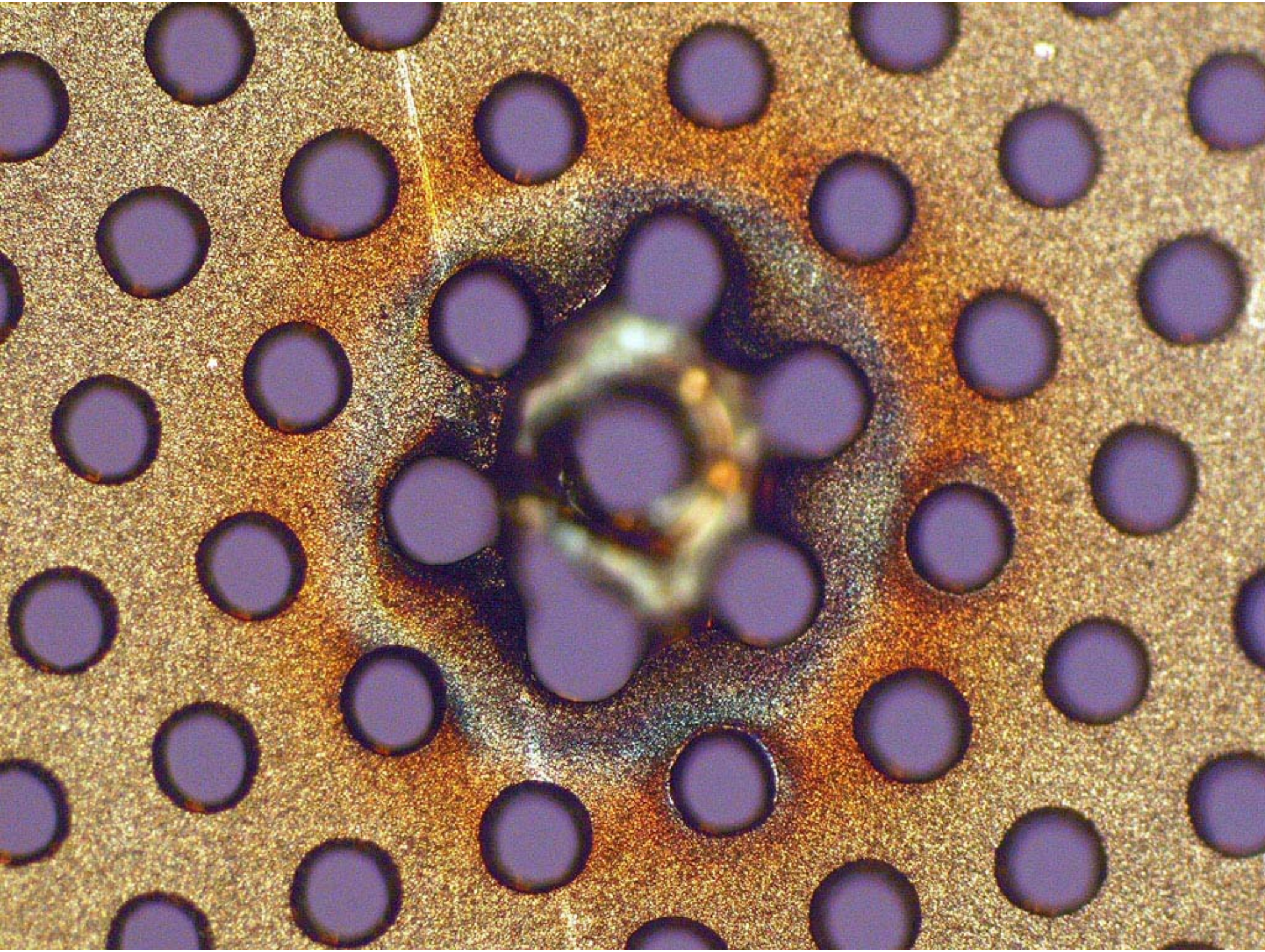

27
28
29
3
2
1
mm

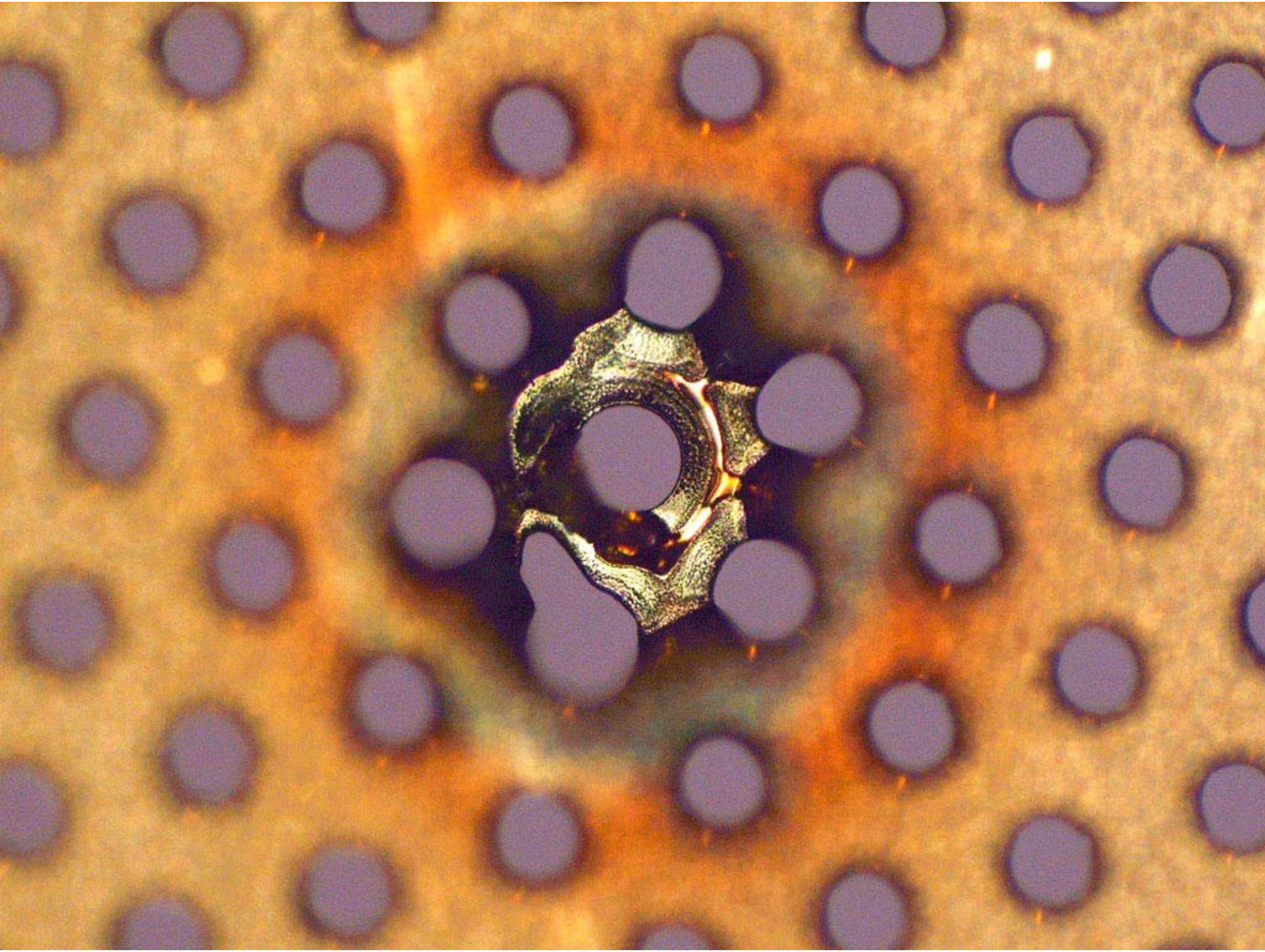

200 µm

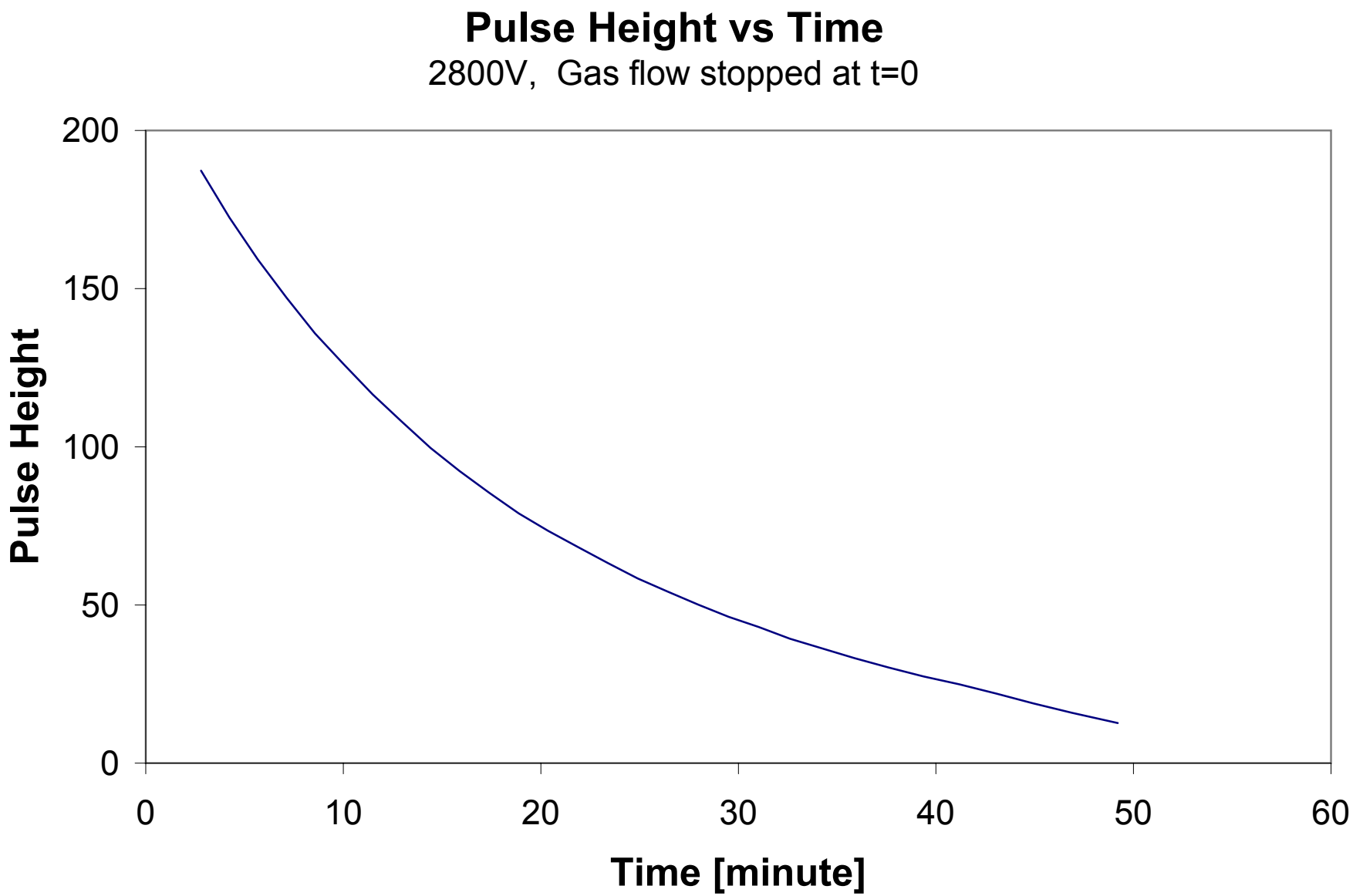


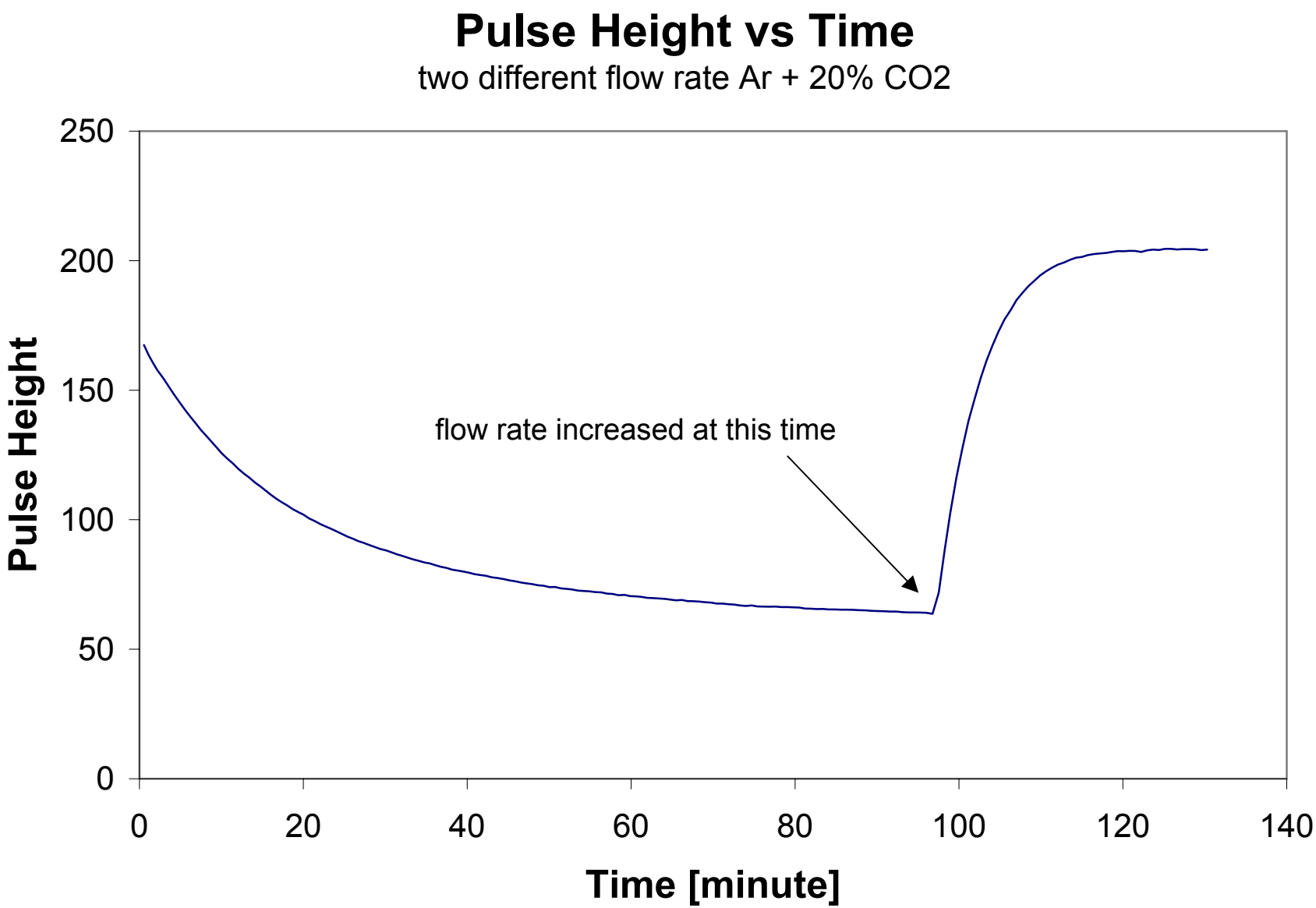

20 µm

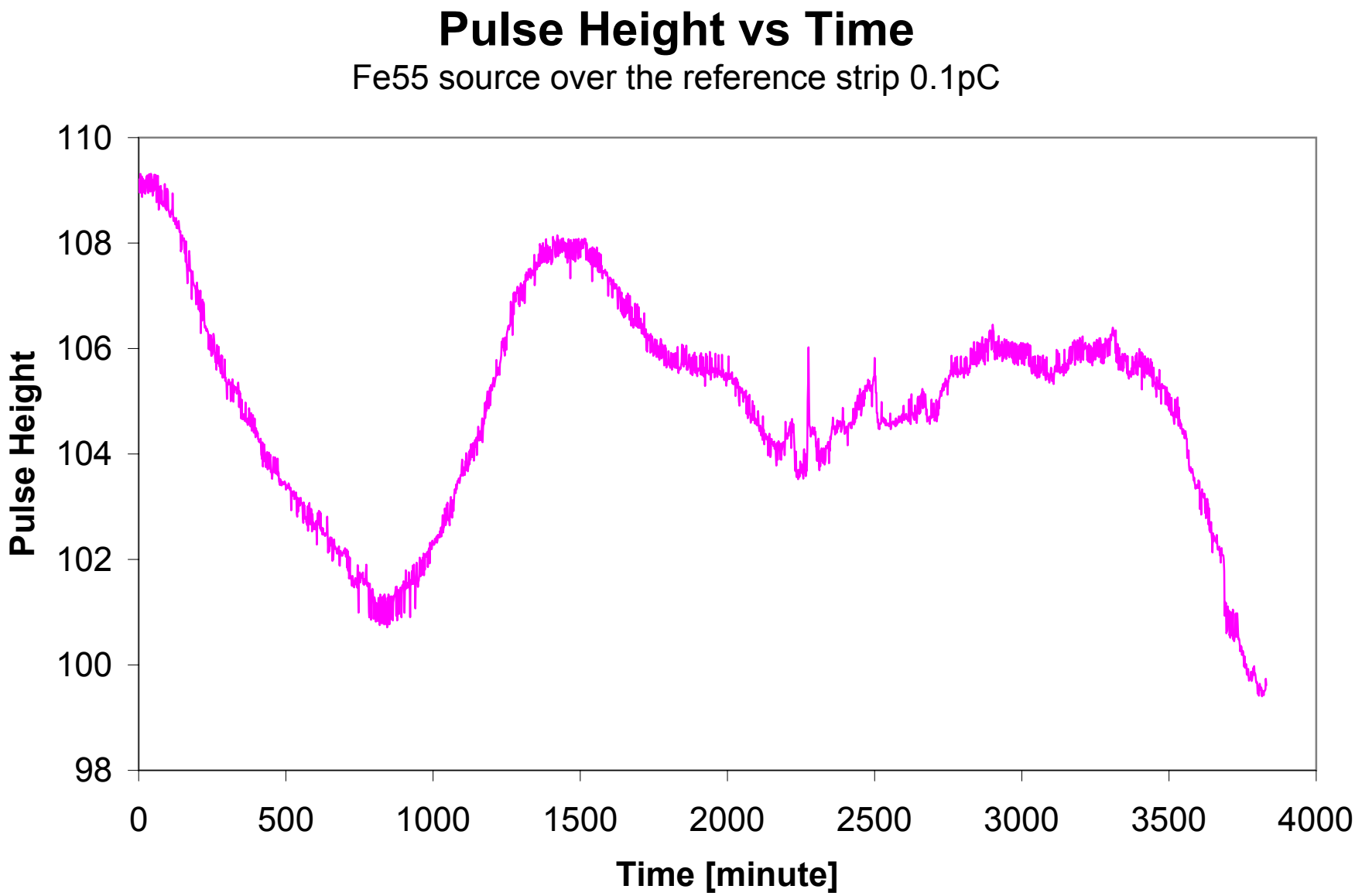


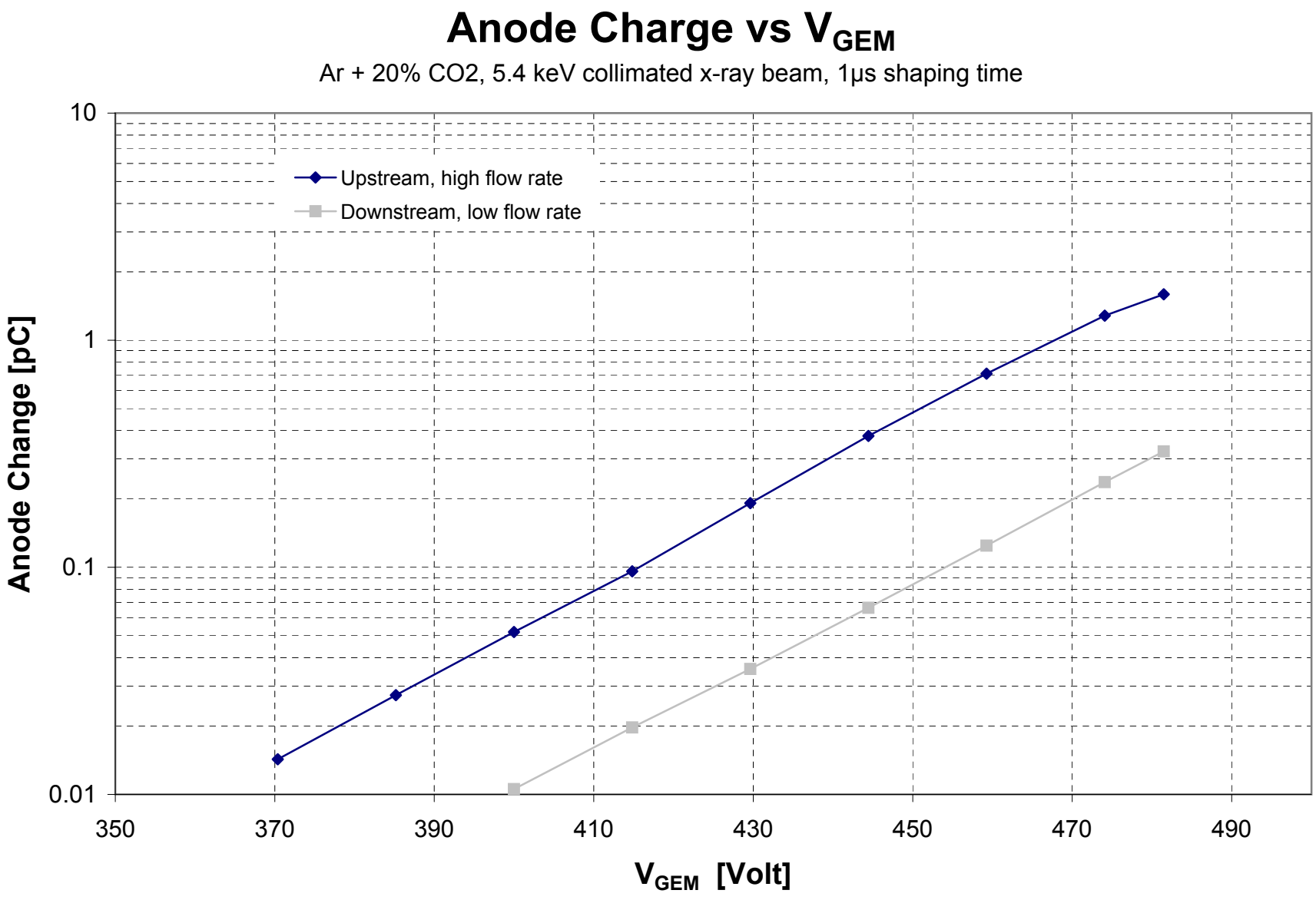


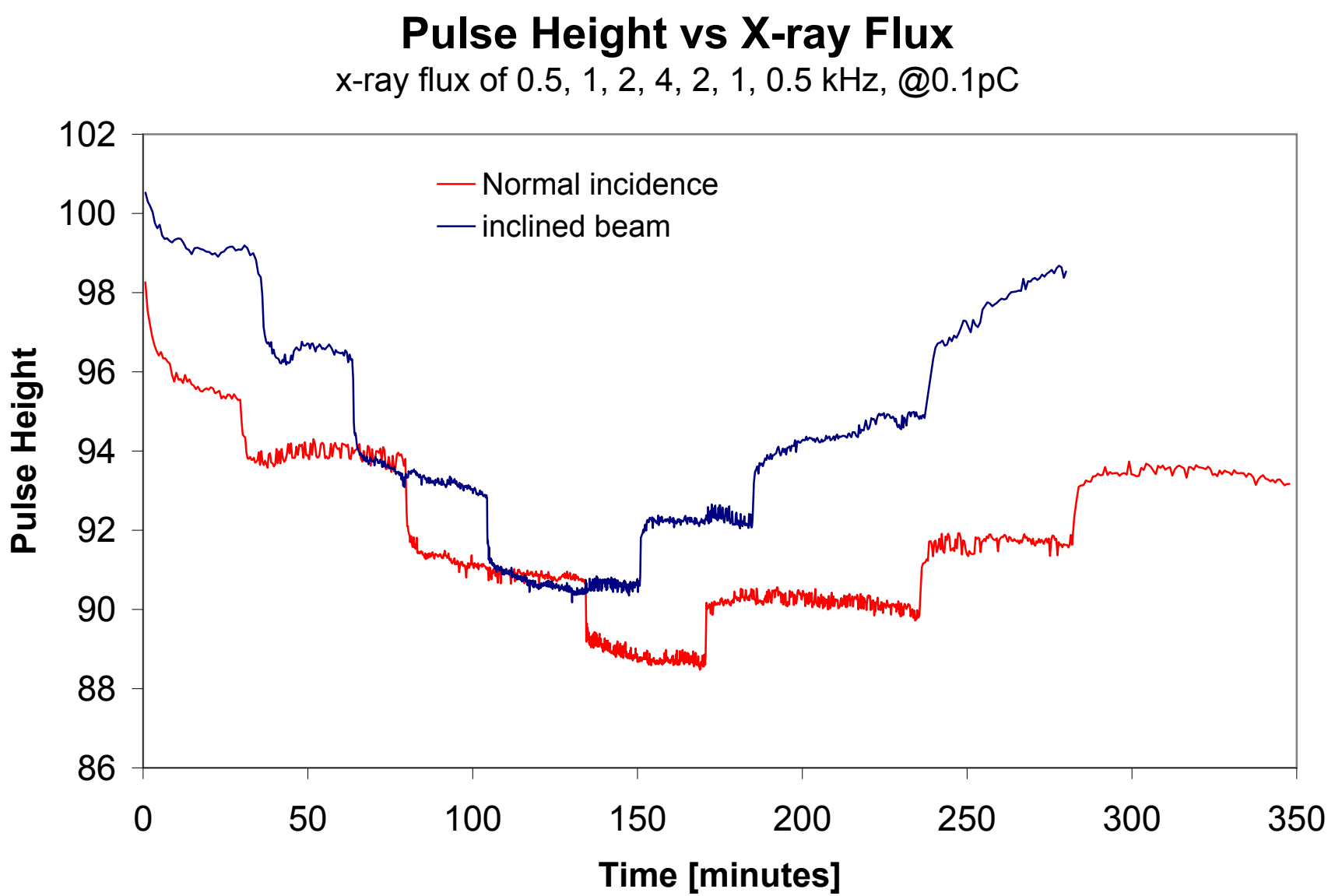



Pulse Height vs Time
2800V, Gas flow stopped at t=0
Pulse Height
200
150
100
50
0
0
10
20
30
40
50
60
Time [minute]


Pulse Height vs Time
two different flow rate Ar + 20% CO2
Pulse Height
250
200
150
100
50
0
0
20
40
60
80
100
120
140
Time [minute]
flow rate increased at this time

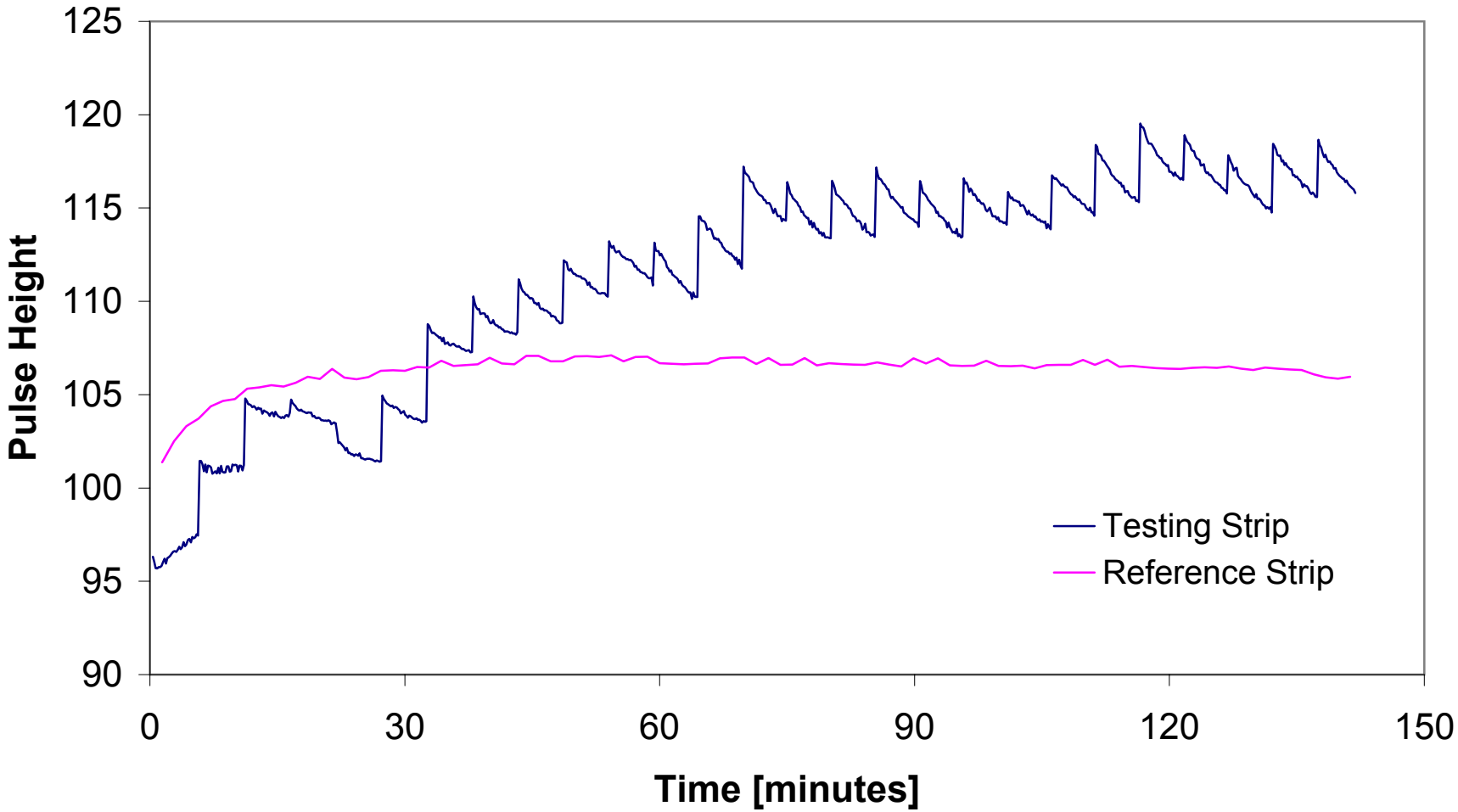

Pulse Height vs Time
Fe55 source over the reference strip 0.1pC
Pulse Height
110
108
106
104
102
100
98
0
500
1000
1500
2000
2500
3000
3500
4000
Time [minute]


Anode Charge vs V_{GEM}
Ar + 20% CO2, 5.4 keV collimated x-ray beam, 1μs shaping time
Upstream, high flow rate
Downstream, low flow rate
Anode Change [pC]
10
1
0.1
0.01
350
370
390
410
430
450
470
490
V_{GEM} [Volt]


Pulse Height vs X-ray Flux
x-ray flux of 0.5, 1, 2, 4, 2, 1, 0.5 kHz, @0.1pC
Normal incidence
inclined beam
Pulse Height
102
100
98
96
94
92
90
88
86
0
50
100
150
200
250
300
350
Time [minutes]

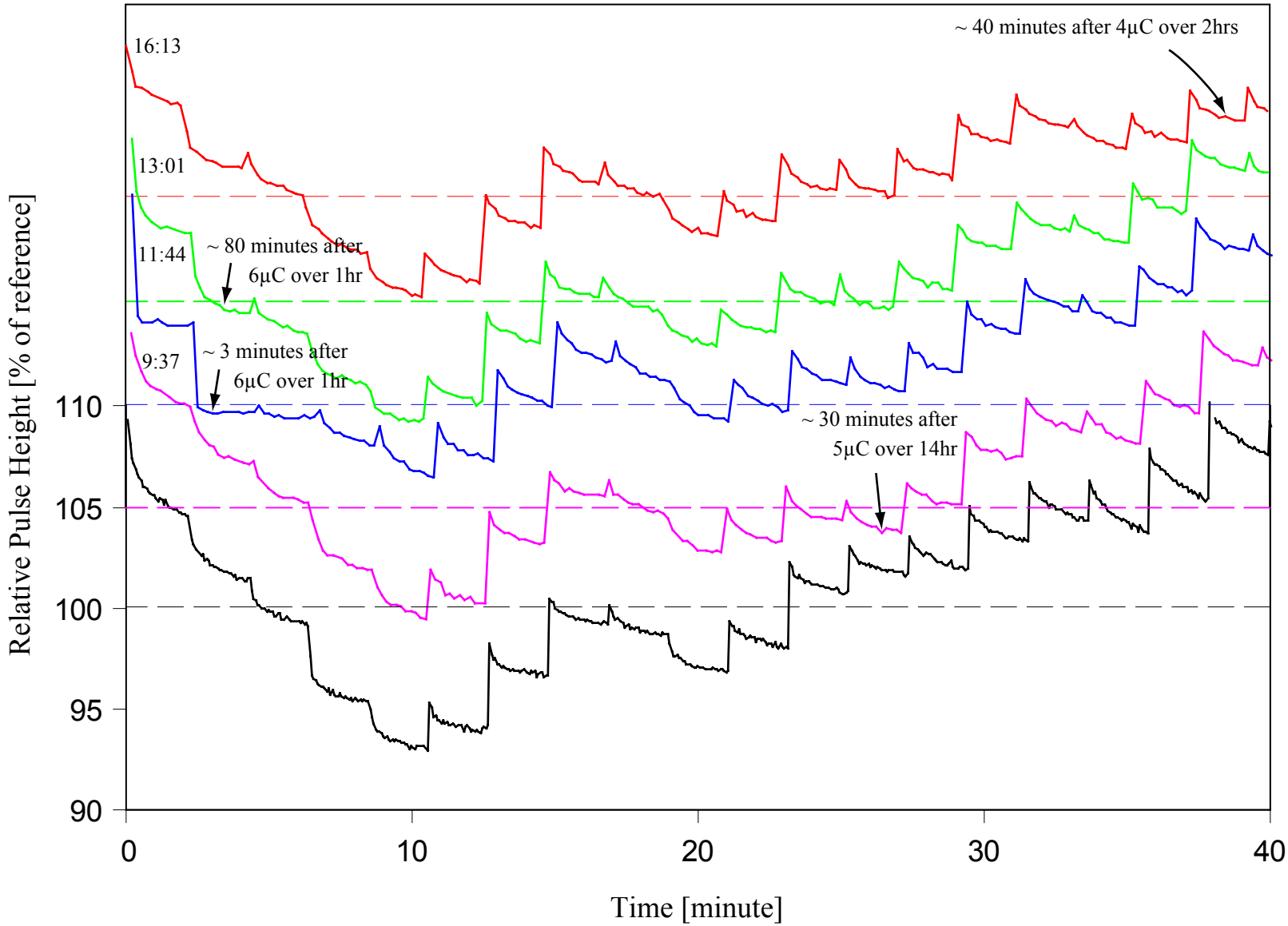
Pulse Height as a function of Position

5.4 keV x-ray beam stepped along strip at 1mm intervals, Qa=0.1pC, ~2kHz



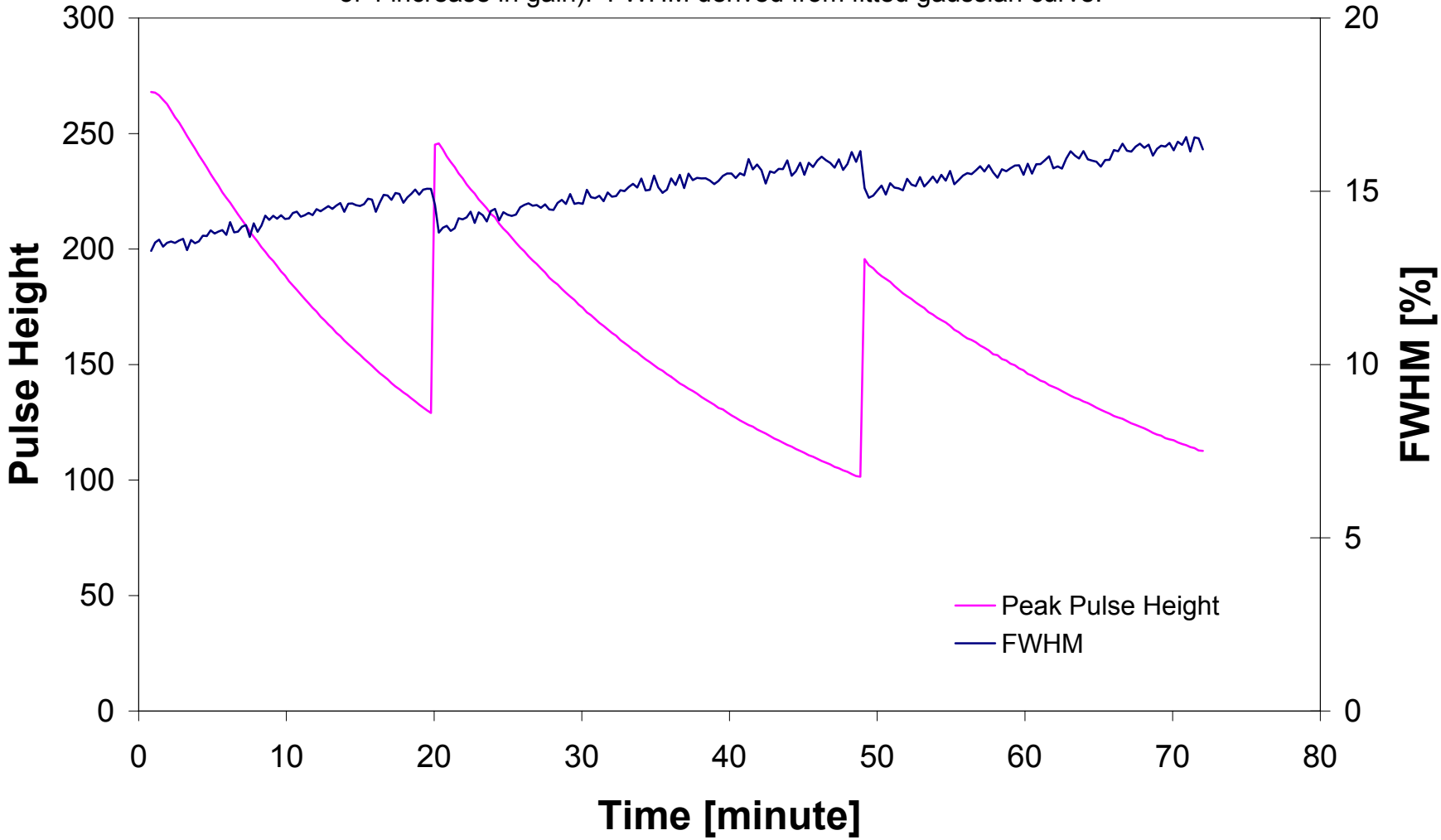
Scans Along the Strip Length at 1mm Intervals

5.4 keV x-rays, 0.1pC, 2kHz, Ar+20% CO_2 □
(each curve is shifted up by 5%)



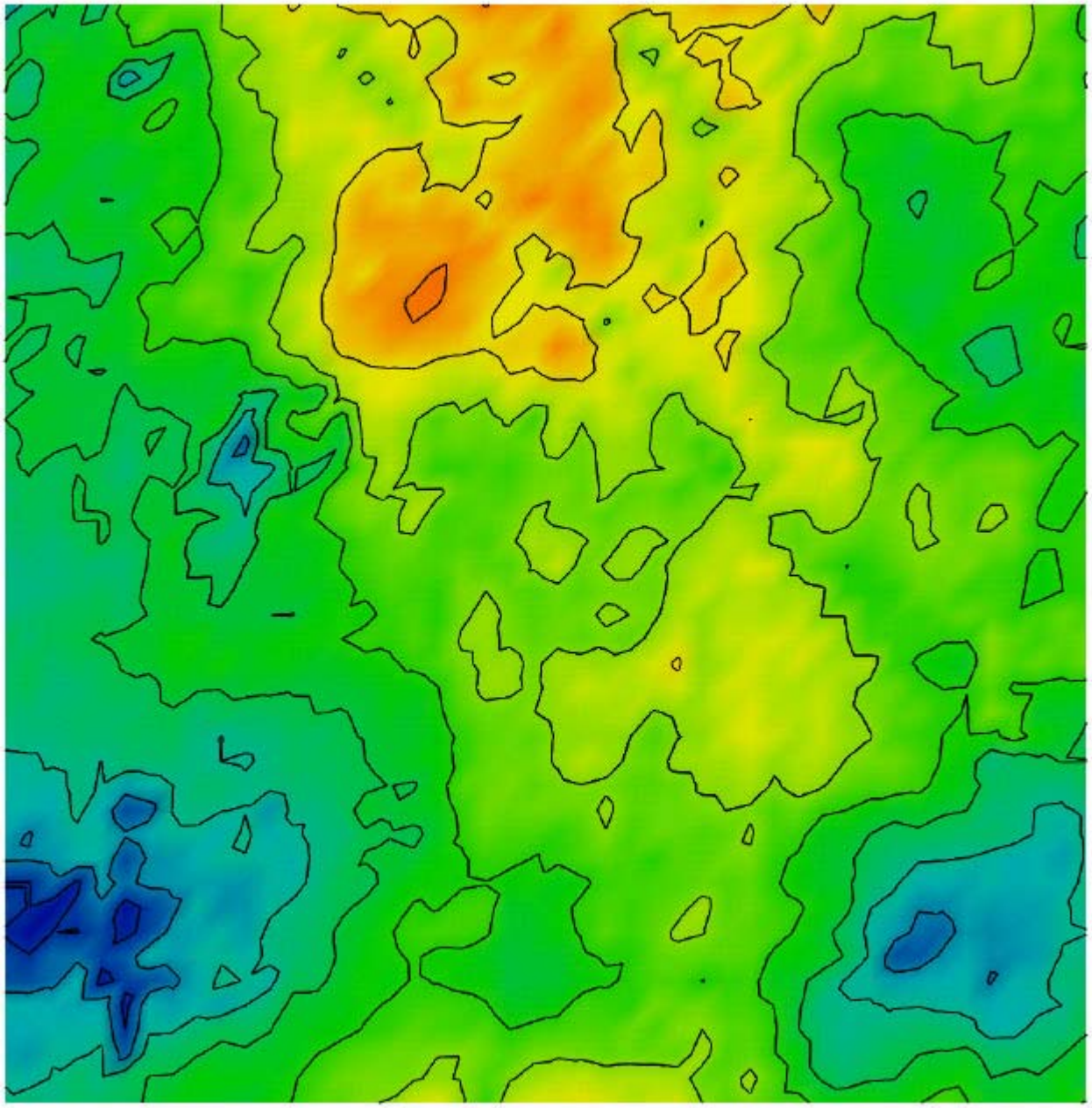
Lifetime and Energy Resolution

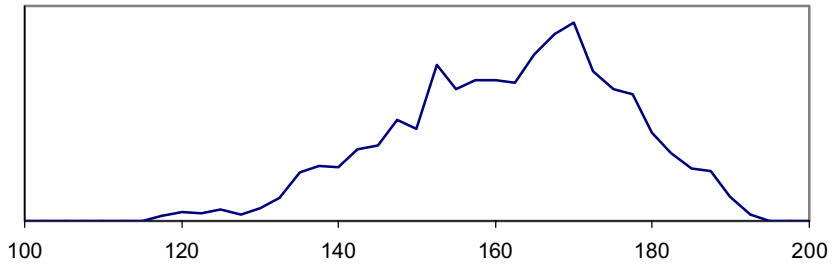
Ar+20% CO_2 gas flow stopped, HV increased twice during the measurement (equivalent to a factor of 4 increase in gain). FWHM derived from fitted gaussian curve.



Double GEM Gas Gain Uniformity

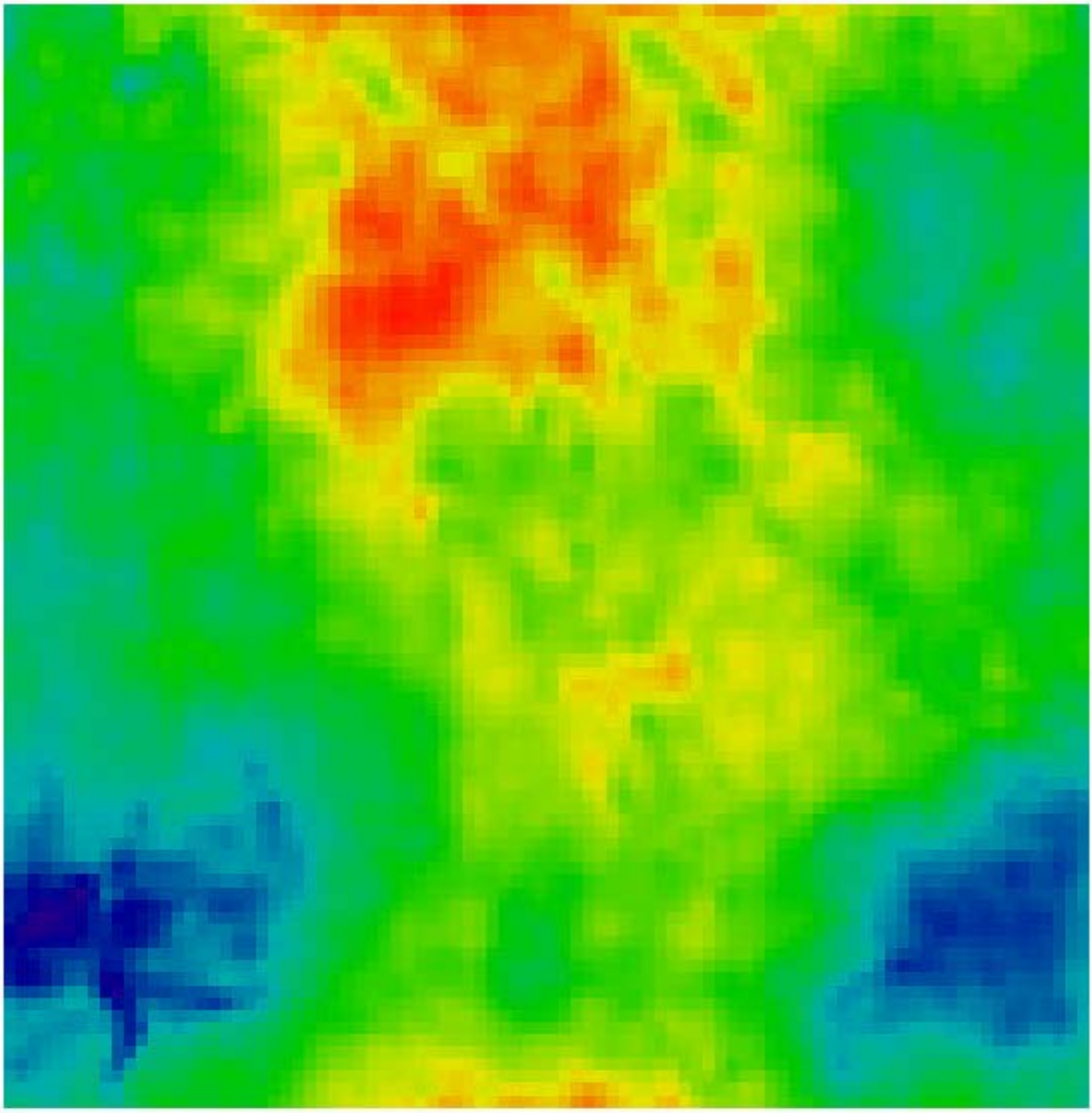
Collimated 5.4keV x-ray, at 2mmx2mm grid, 9cmx9cm area

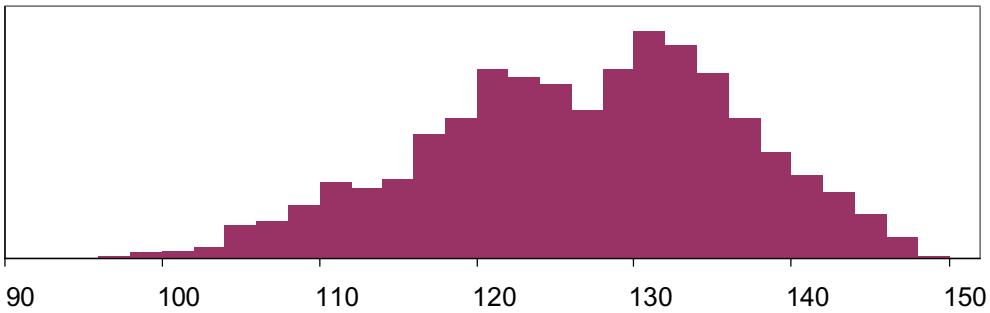
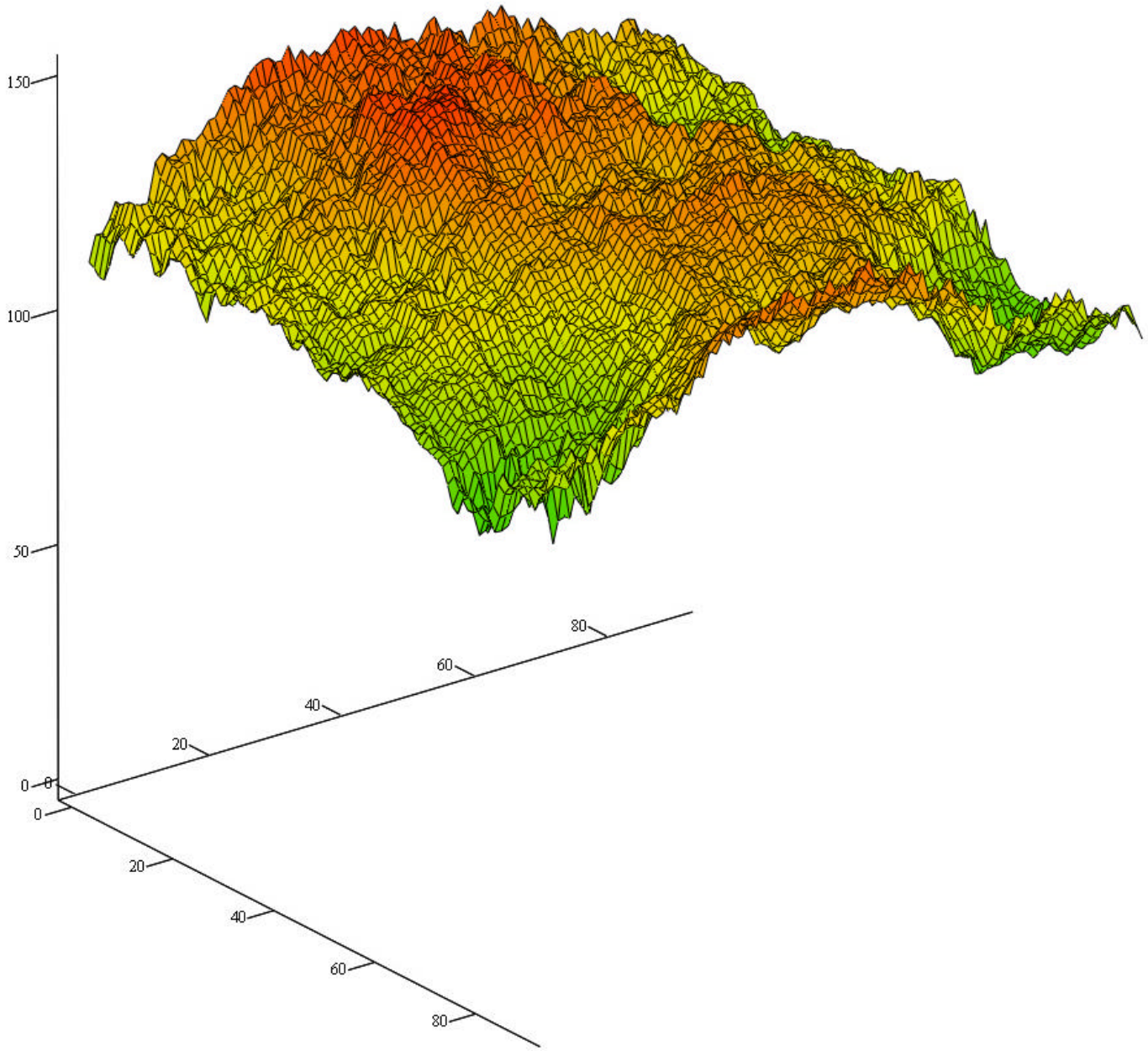




Double GEM Gas Gain Uniformity

Collimated 5.4keV x-ray, at 1mmx1mm grid, 9cmx9cm area





Gas Gain Uniformity of the Double GEM