U-Penn ASIC Carrier Board
Inspection Images
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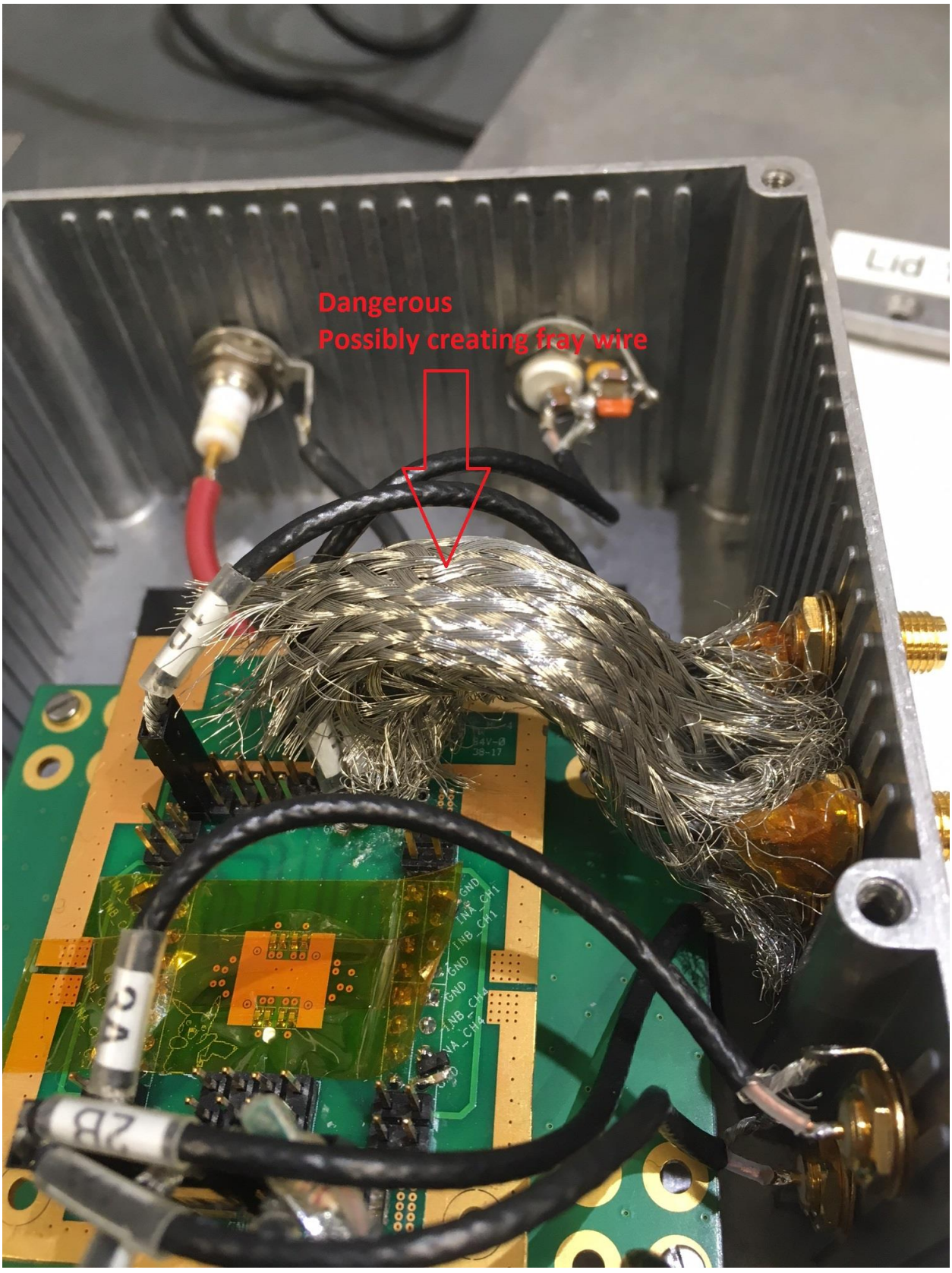
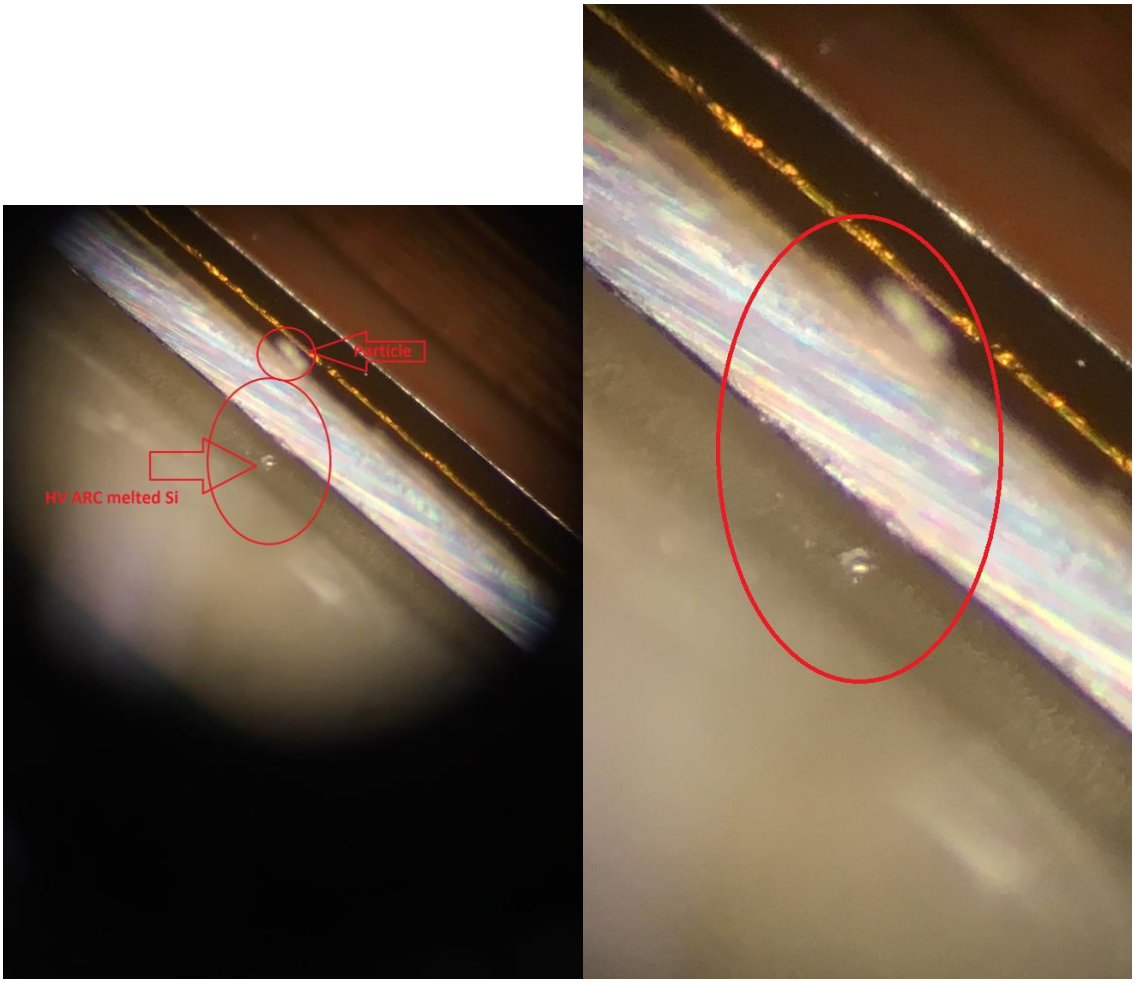
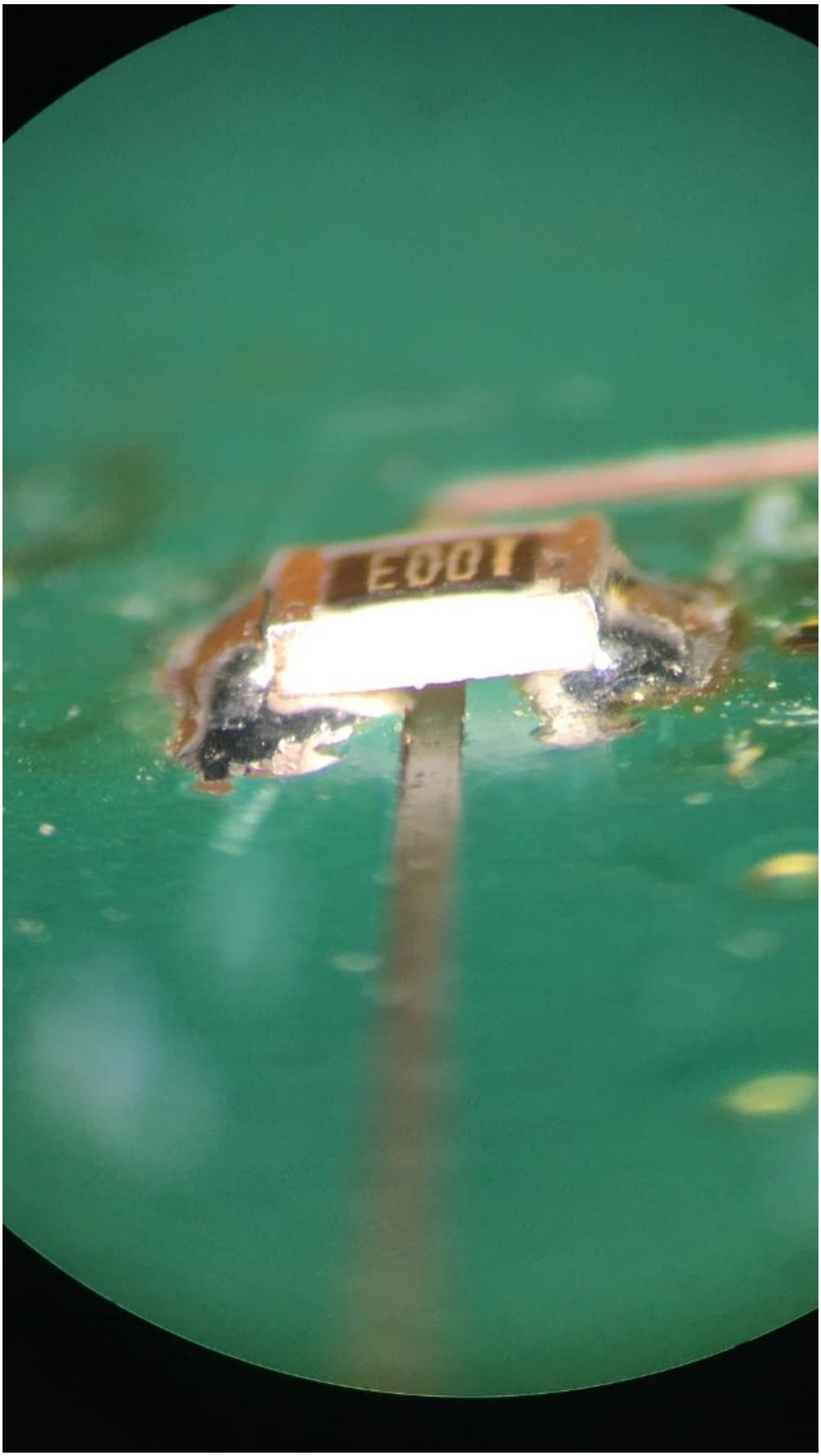
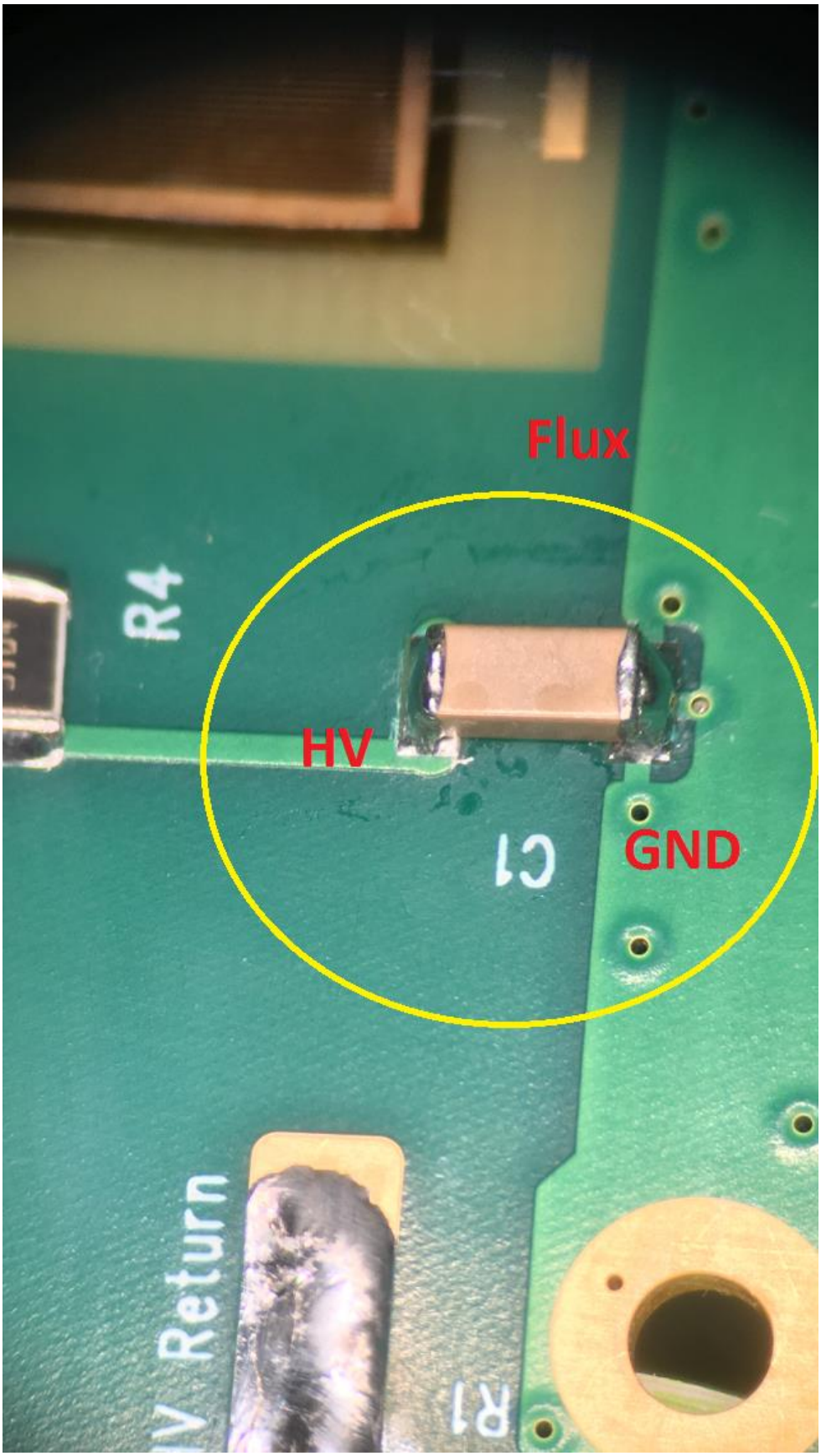
U-Penn (Mitch's Comments): APD on the carrier board with
>> the trenching around the ground plane. When it arrived we found
>> that the PCB needed to be cleaned with surface mount components
>> removed to eliminate leakage currents. This worked and were able to
>> bias up to 1750V with leakag current well below 1uA. With the
>> amplifier connected we saw substantial oscillations which were
>> quieted down to less than a mV on the output by covering the output
>> cables with braid. To get a good gain calibration we then tried to
>> measure the Fe55 peak. Biasing the APD again we got a measurement with
>> a lower than expected gain.
>> After making a small change again on the FASTAMP board the APD
>> current became a significant problem again. After ensuring that
>> the HV hookup was not leaking we decided to send it back to you to
>> see if you could identify the source of leakage. We saw no evidence
>> of leakage when the series biasing resistor on the carrier board
>> just before the APD was removed placing the location of the leakage
>> current around or in the APD.

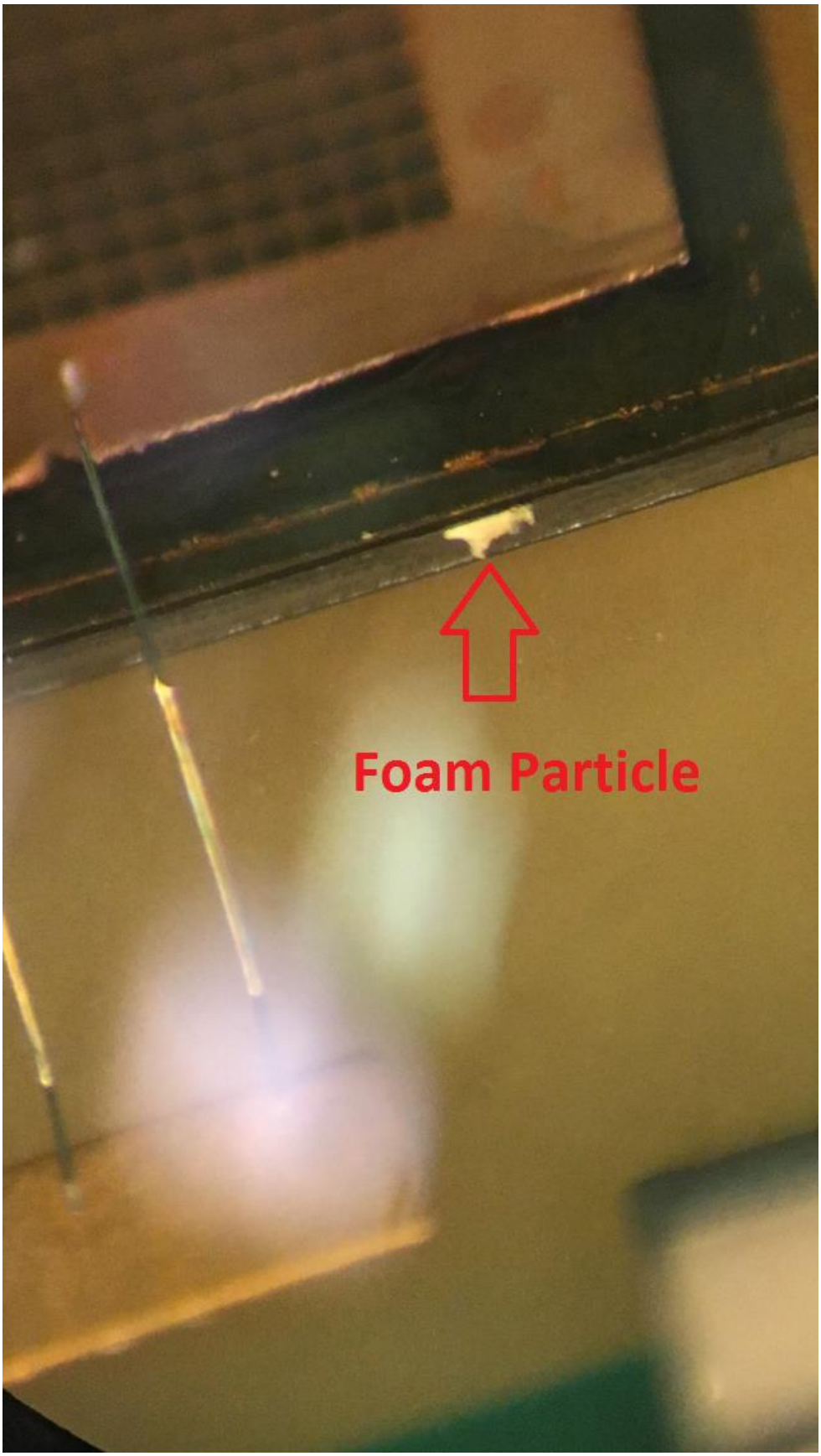
Princeton (Bert's Comments): > Before I got started I confirmed the 20M ohm reading you saw at Penn.
> Actually this 20Mohm is the sum of the (4) 5Mohm series R's. Probing
> the APD I measure a DC resistance of about 480K (very low). So the
> actual measurement from the HV connector was the 20M + 480K or 20.48M
> ohm. I managed to take several photos of suspicious concern before
> removing the wirebonds and mesh (I will share them shortly). After removing the mesh I
> isolated the APD and DC probed it and still measured the 480K. I then
> took the PCB up into my cleanroom and did an ultrasonic solvent clean
> with Acetone followed by an Isopropanol rinse. My last stop was in
> our barrel asher for a soft non-biased o2 plasma clean for 5 minutes.
> I returned to my lab and probed what now seems to be expected on
> the measurement of the APD (many meg ohm 20+). I will have to replace
> the screen and wirebond it before it can be retested. We may want to
> have Mickel coat it as the images I will share show quite a bit of
> hygiene concerns.

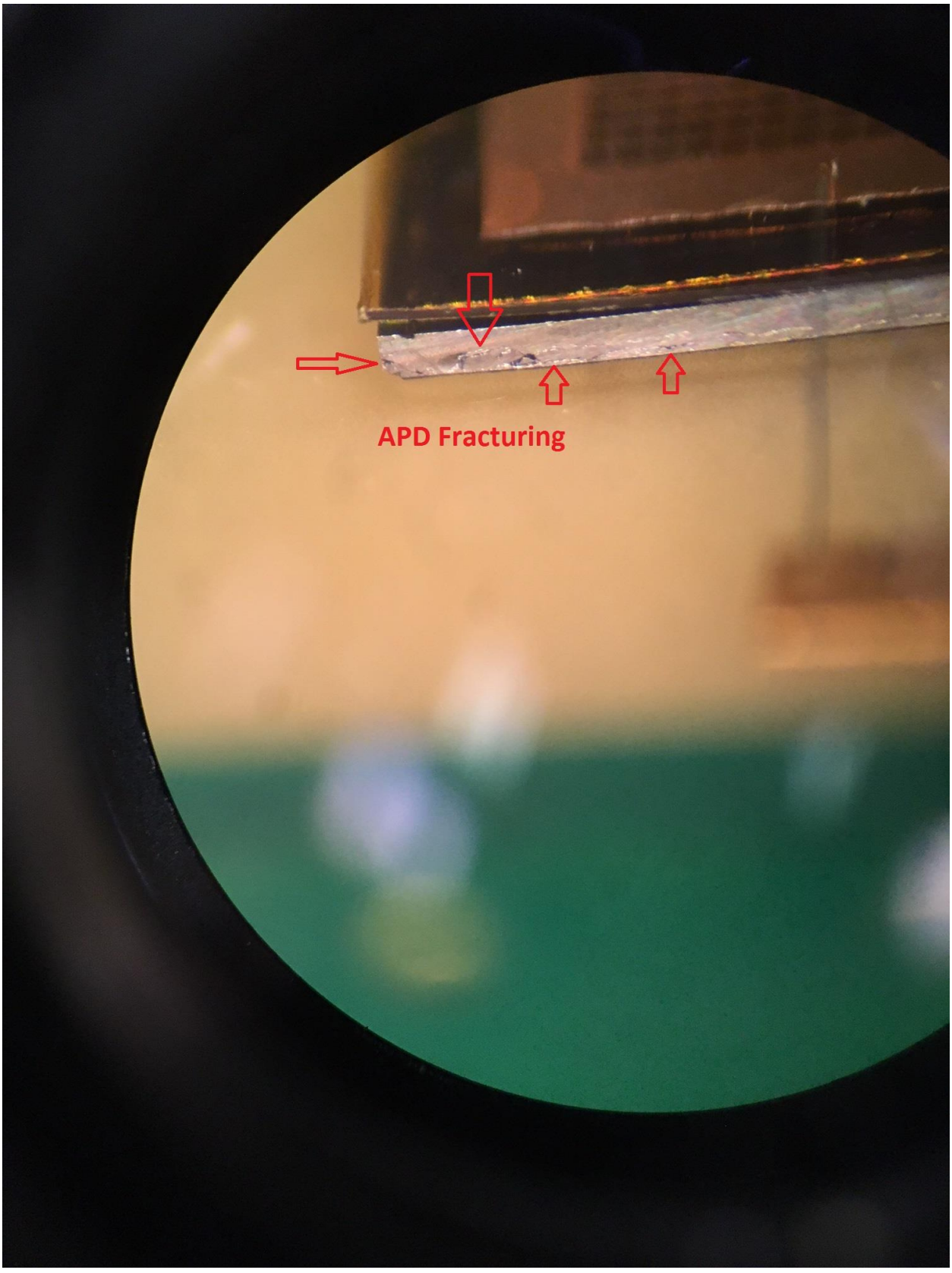

Dangerous
Possibly creating fray wire
Lid
INA_GND
INA_CH1
INB_GND
INB_CH1
GND
GND
INB_CH4
INA_CH4
2A
2B


Particle
HV ARC melted Si


E001


Flux
R4
HV
C1
GND
V Return
R1


Foam Particle


APD Fracturing