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# Plans for Life-Testing

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# The Problem

## MCPs lose gain over time

apparently related to the amount of extracted charge

typical life: 1..5 C/cm$^2$

what is the root cause?

electron extraction ? .. 100-eV electrons don't dislodge atoms

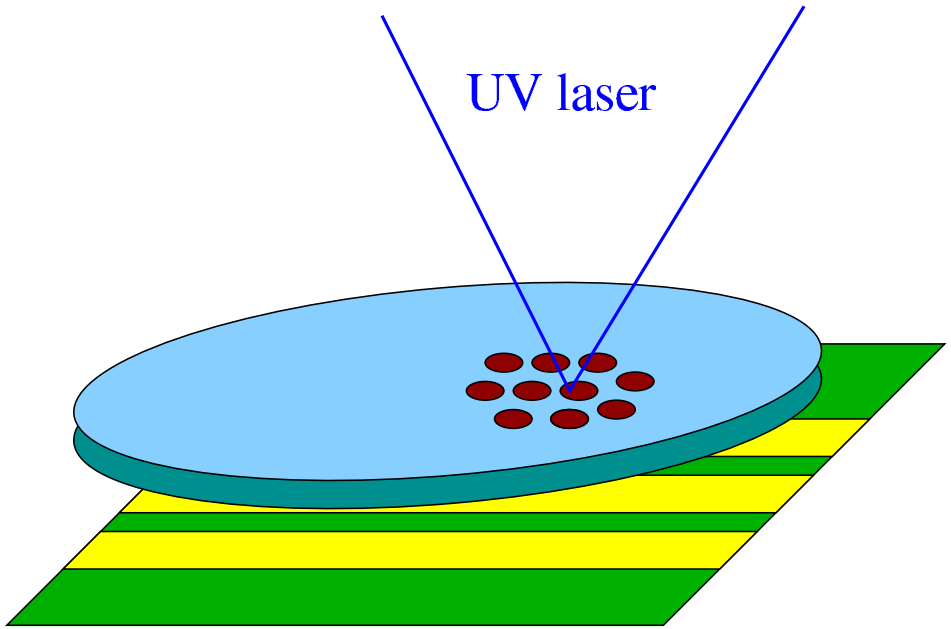
something chemical?

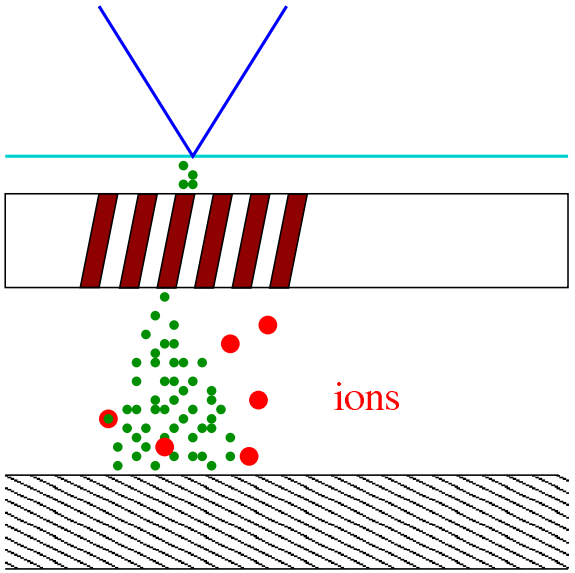
ion feedback?

is it happening inside the pores, or longer-range effects?
(see figure next slide)

# Investigation

focus UV laser $<$ pore diameter
enough electrons for single-plate testing
drive electron cascades in 1 pore
ion feedback also goes into neighboring pores



# Some numbers

$1\ C/\ cm^2 = 1.6 \cdot 10^{-5}\ C\ /\ (25\mu m)^2$

one pulse: 10 mV into 50 Ω, 2 ns = $4 \cdot 10^{-13}$ C

$4 \cdot 10^7$ laser shots, 11 hrs at 1 kHz

one pore is thoroughly dead after 1 weekend

automated measurement:

linger on 1 pore, look at neighboring ones once an hour

# What to look at

gain over time in one pore vs. neighboring ones
any changes in timing, waveform?

if evidence for ion feedback: different gas species, pressures

Post-mortem:

compare aged vs. pristine pores in SEM