Optimization of 33 mm Operational Parameters

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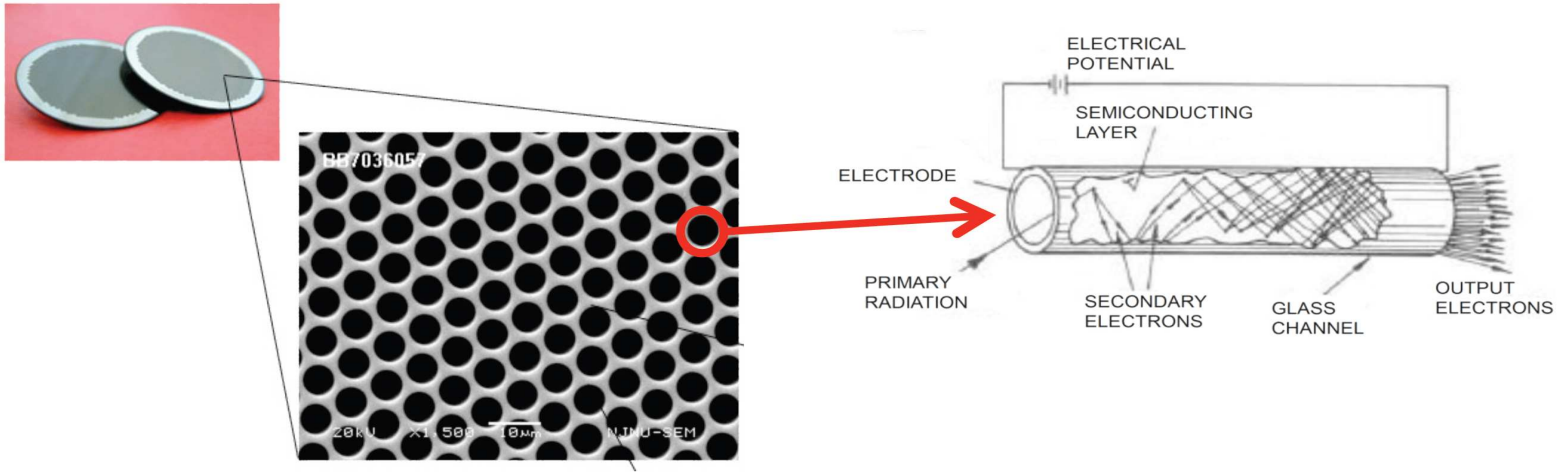
Goals

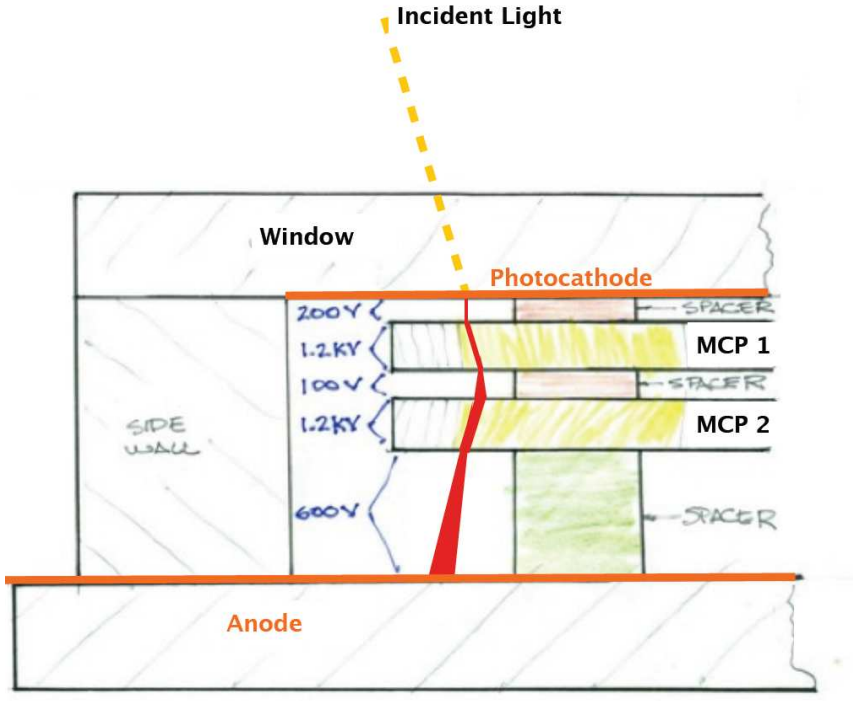


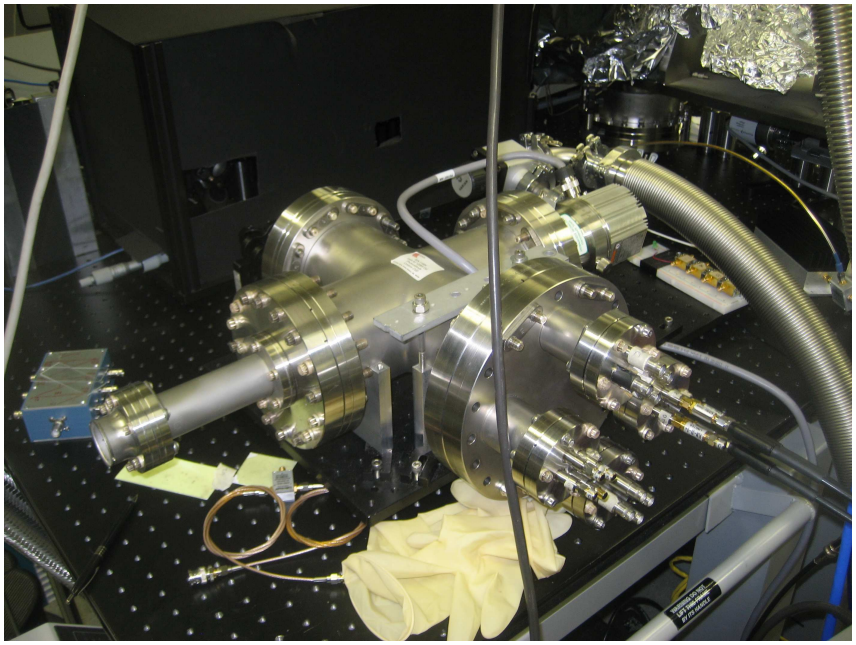
Understand MCP physics characteristic

- **MgO vs Al_2O_3 (Matt's talk)**
- **Gain vs voltage (this talk)**
- **How resistance affects MCP performance?**
- **Feedback to the MCP simulation (Matt's talk)**
- **What are the key elements for best timing performance?**

What we learn with 33 mm can be useful for 8'' setup

Experimental Setup





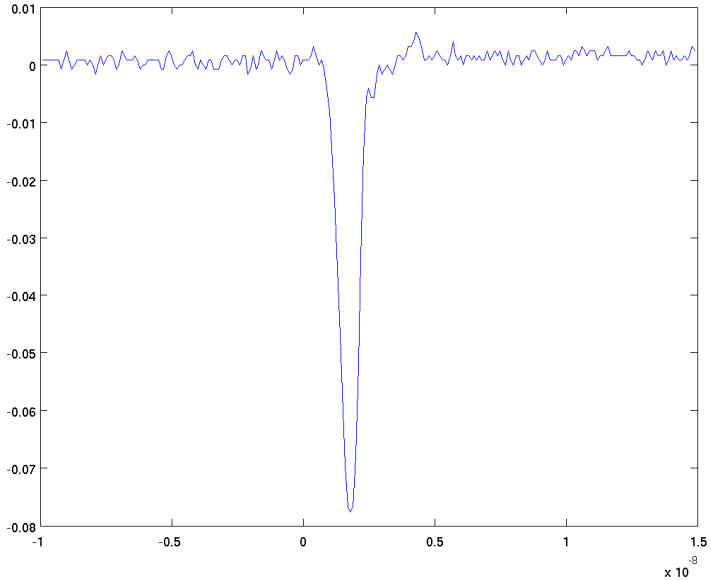
5 voltage gaps: PC, MCP1, inter MCP, MCP2, Anode
Typical voltages: ~200V, ~1kV, ~100V, ~1kV, ~1.2kV

Data

Single photo-electron operation

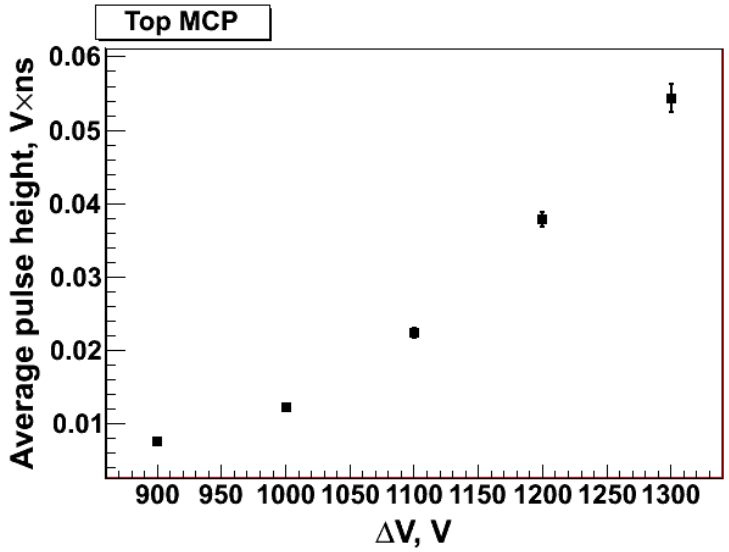
Anode pulses:

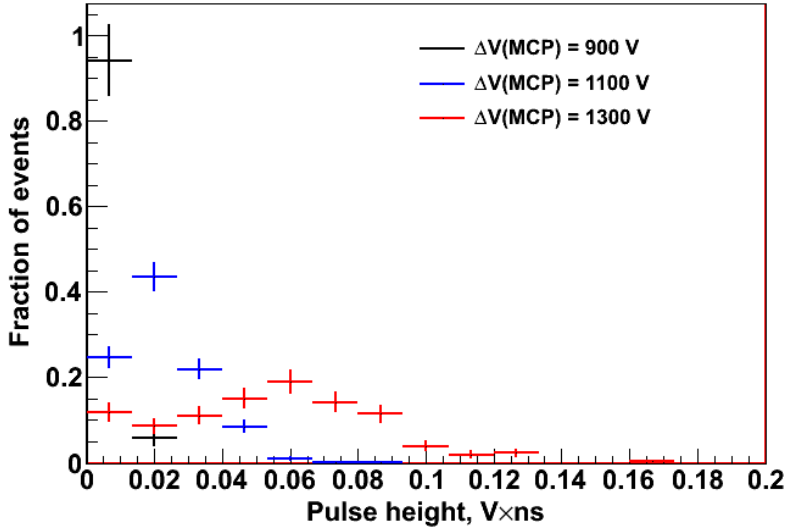
- Gain
- Shape
- Timing



Voltages scan: Top MCP

MgO MCP pair with ~1 GOhm matched resistance

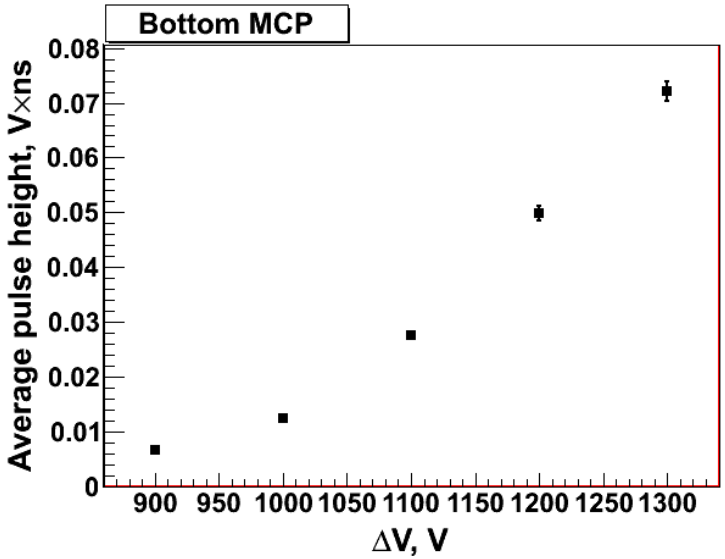


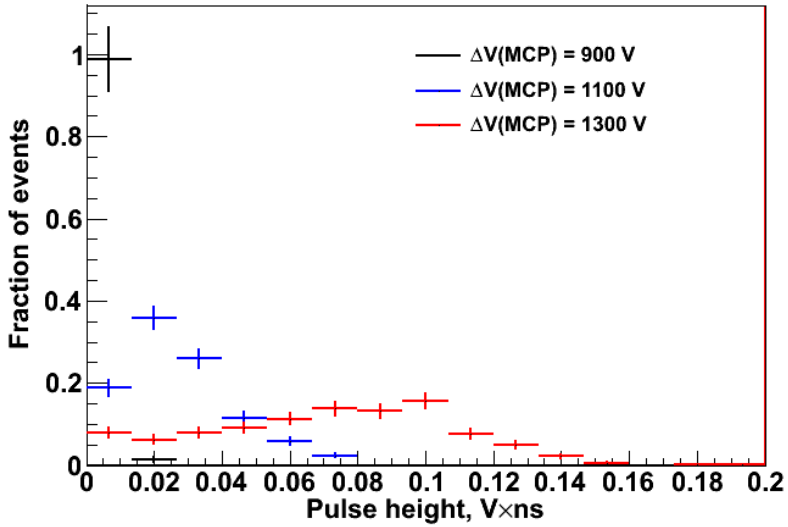


Pulse height = Integral of the pulse

Voltages scan: Bottom MCP

MgO MCP pair with ~1 GOhm matched resistance

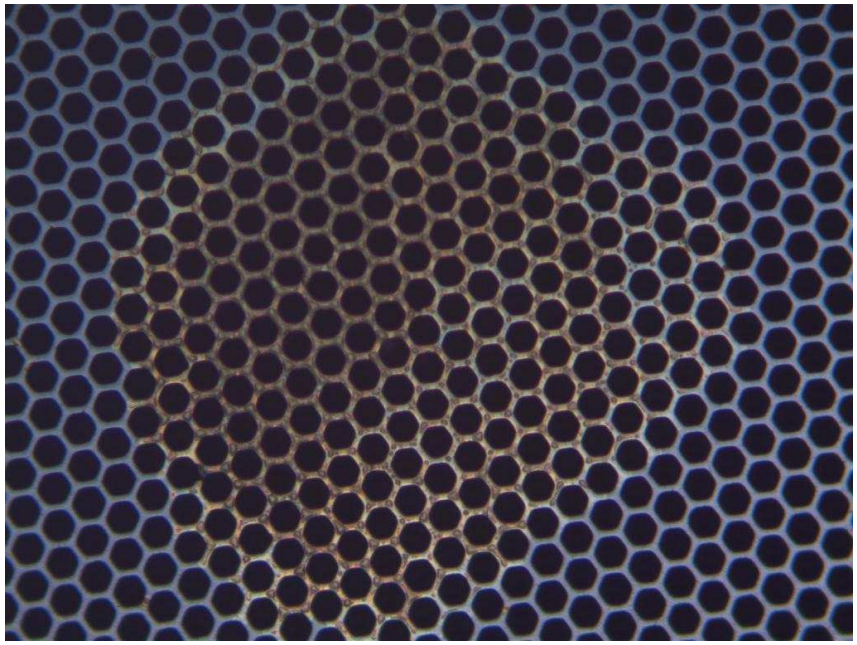




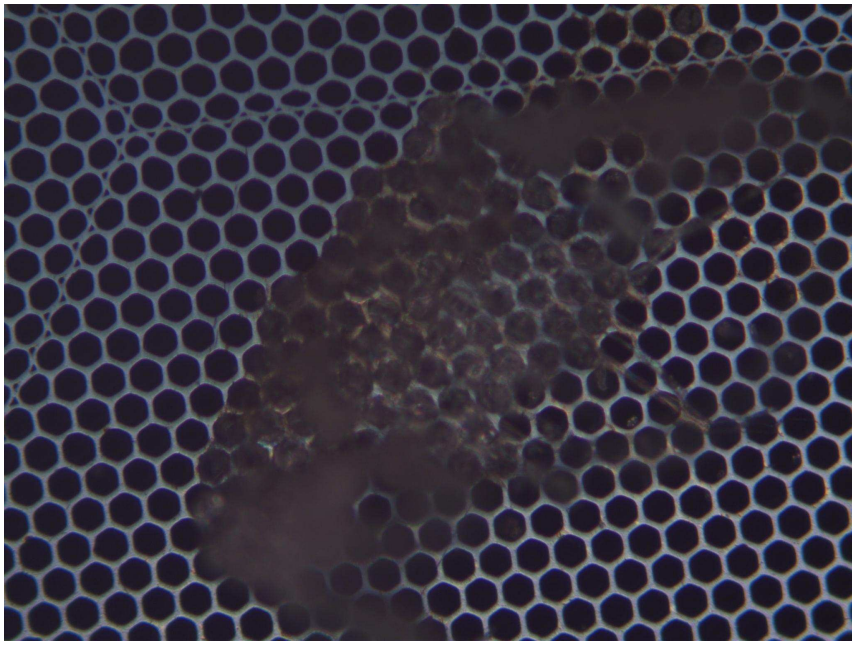
There is a HV limit

~2kV across MCP

Front side

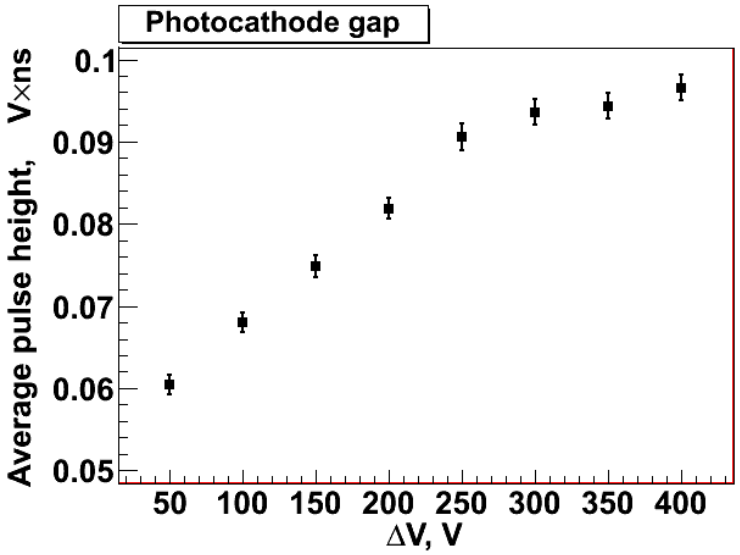


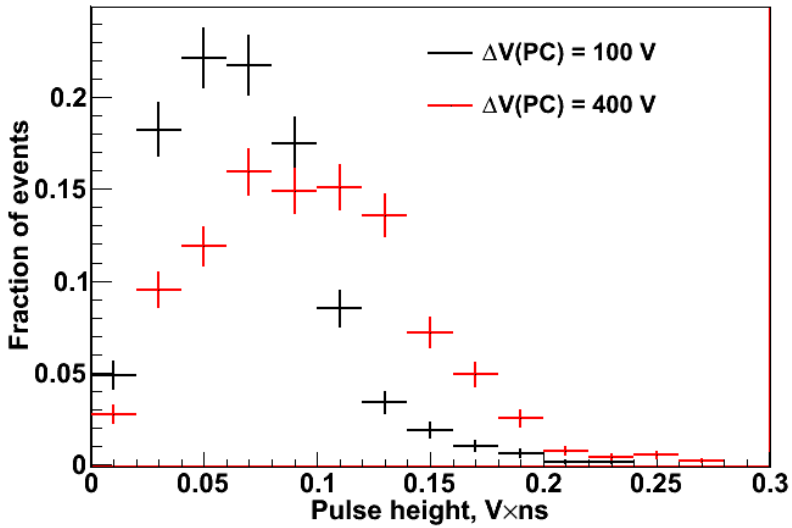
Bottom side



Voltages scan: Photocathode Gap

MgO MCP pair with ~40 MOhm matched resistance





Summary and plans

- We are learning about MCP from 33 mm setup at the laser lab at Argonne APS
- Began systematic studies of voltage gaps
- Very close to substitute the scope data by the data from the chip (Eric’s talk)
- Focus on timing characteristics