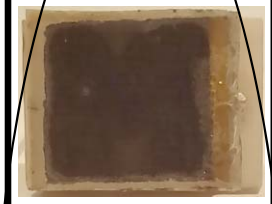
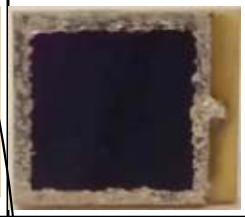
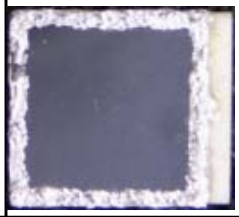
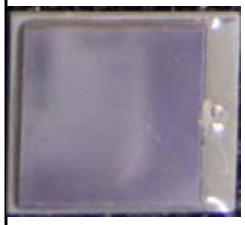
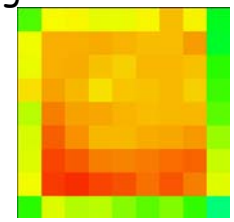
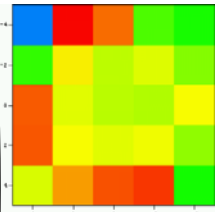
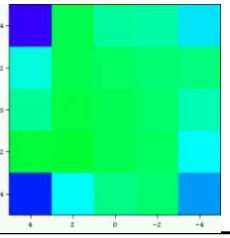
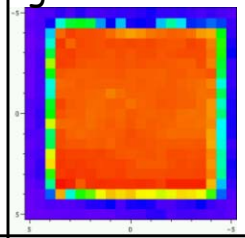
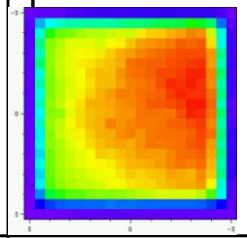
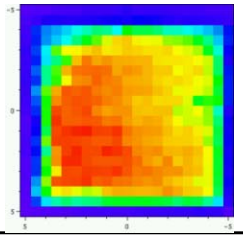
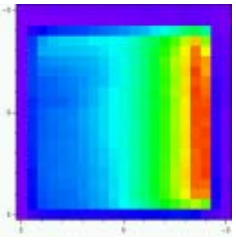
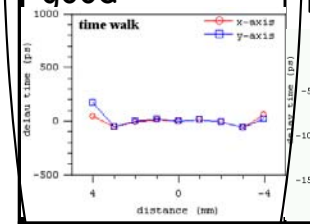
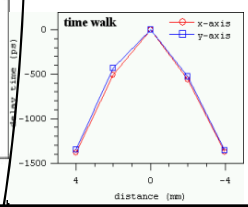
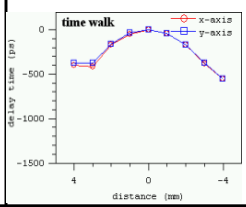
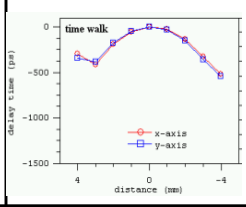
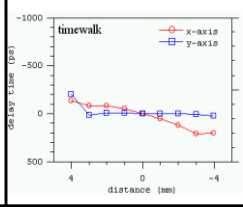
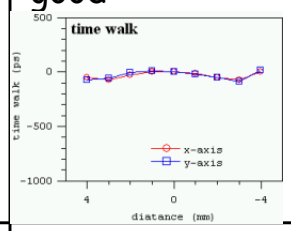
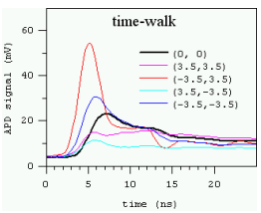
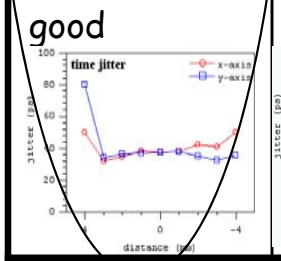
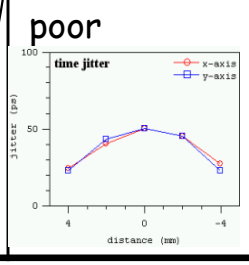
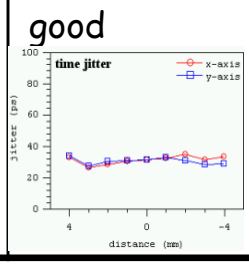
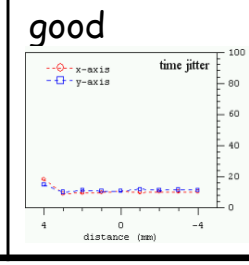
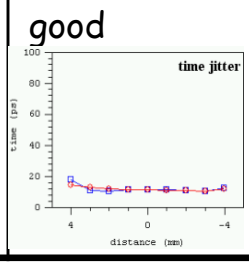
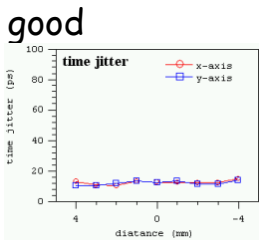
Summary of RMD 8x8 mm² APDs

T. Tsang, *BNL*, Dec. 13, 2013

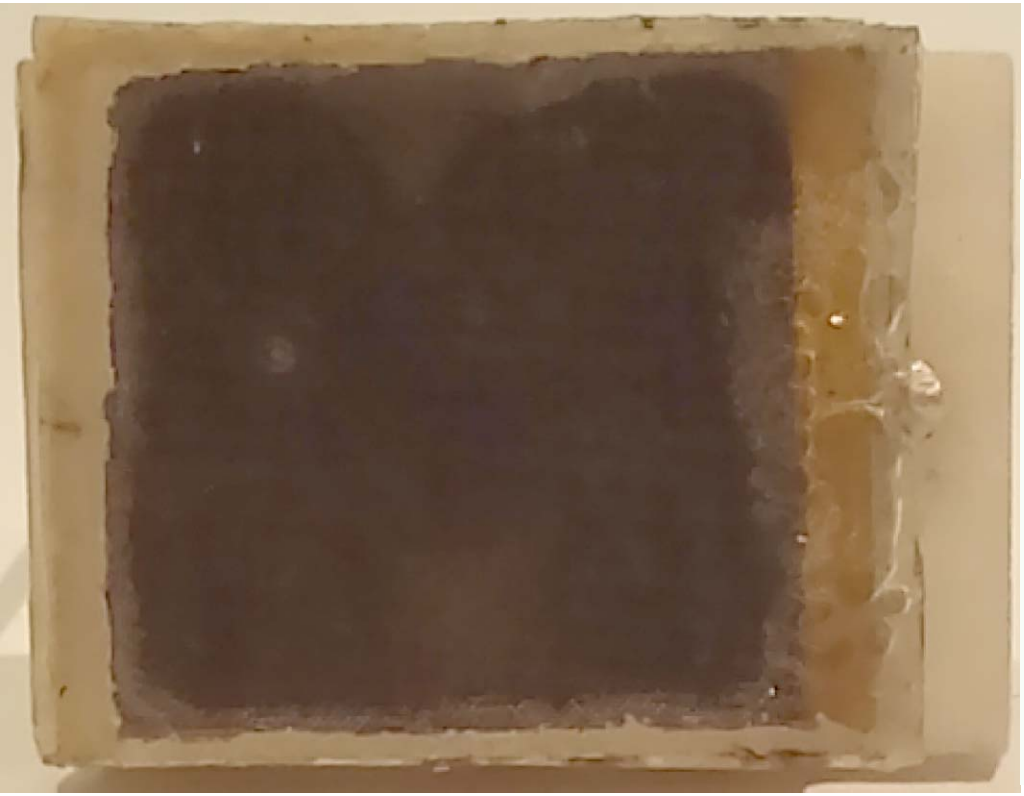
	Dec. 13, 2013 432-6 Mesh	Nov.14, 2013 4 (previously graphene)	Nov.14, 2013 432-6-In	Oct.22, 2012 193A-6-In	Oct.22, 2012 420-3-4	Nov. 20, 2012 432-5	Sept. 26, 2012 unknown
	Al-mesh Au sintered	In-edged No Au	In-edged Au sintered	In-edged Au sintered	Al-coated No Au	Al-mesh No Au	standard n+ diffusion No Au
							
spatial uniformity	good 	fair 	fair 	good 	poor 	poor-fair 	poor 
time walk	good 	poor 	fair 	fair 	good 	good 	poor 
time jitter	good 	poor 	good 	good 	good 	good 	poor data not available

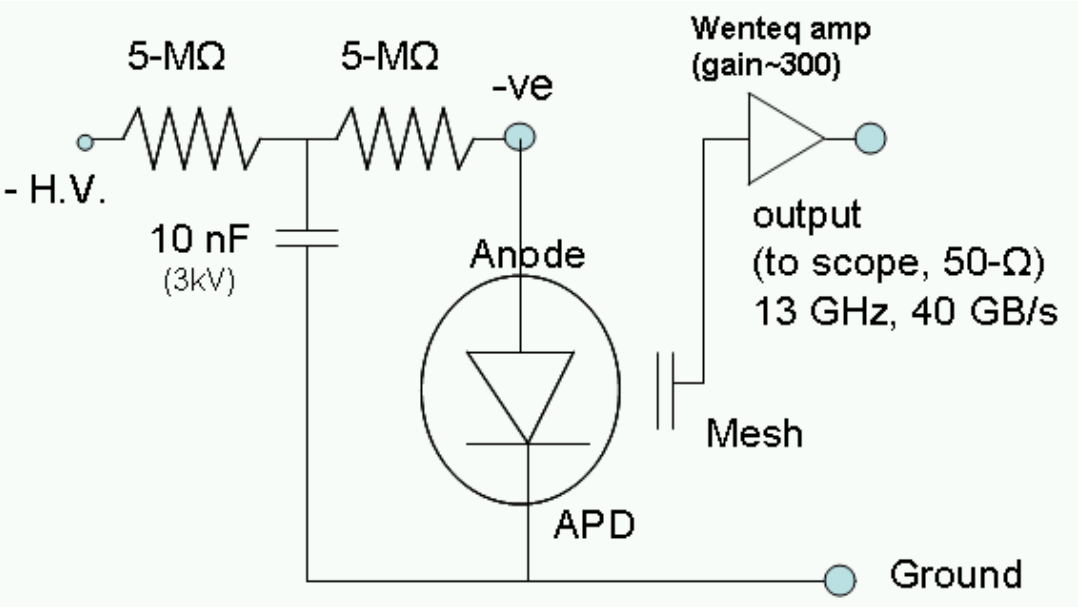
Conclusion: metallic mesh with gold sintered device is the best of all.

We need only a simple parallel plate capacitor geometry to maintain the field lines throughout the entire ADP surface

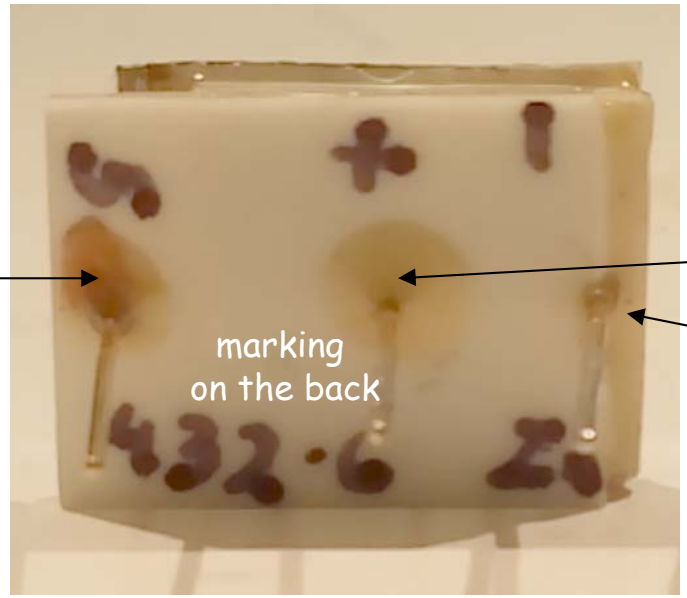
Dec. 13, 2013 APD 8x8 mm²
Al-mesh, Au sintered, s/n 432-6

APD bias at **-1.85 kV**
980 nm Vcsel, ~1 ns pulse, 1 kHz
~1 MIP equivalent photons on APD
(accounted for the transmission of mesh + etc ~50%)





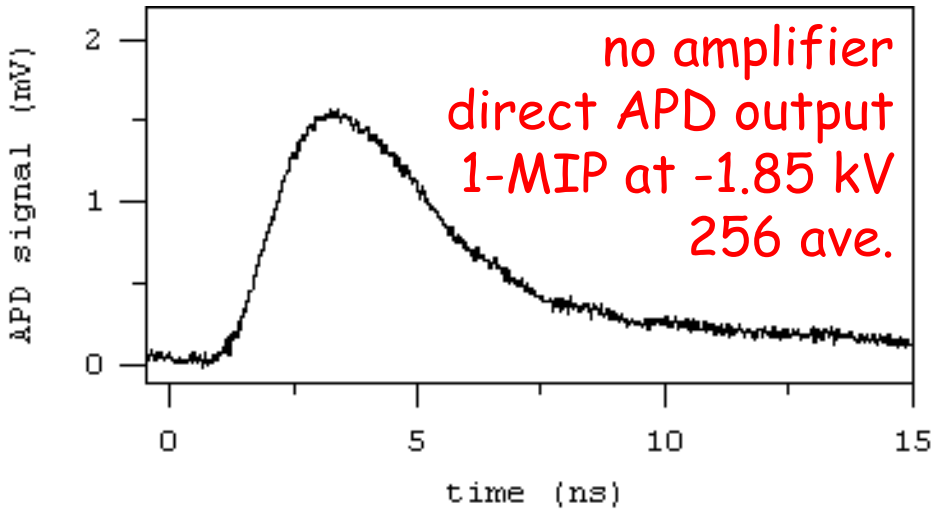
Circuit diagram



Mesh
APD
signal
output

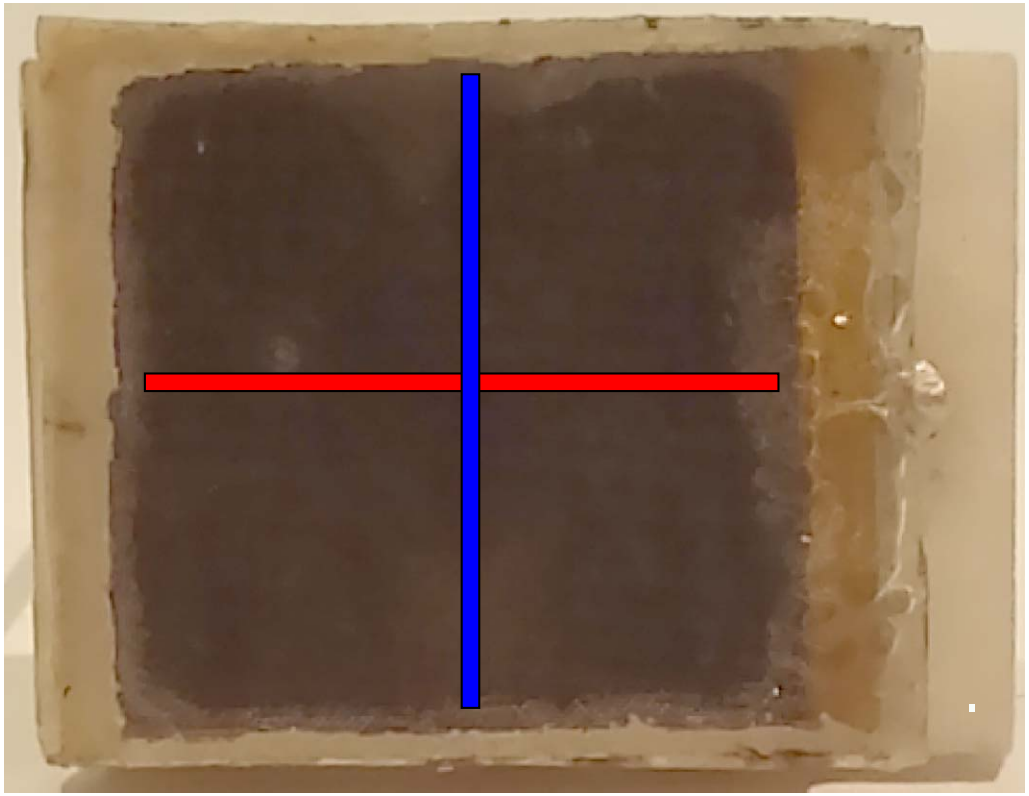
ground

-HV



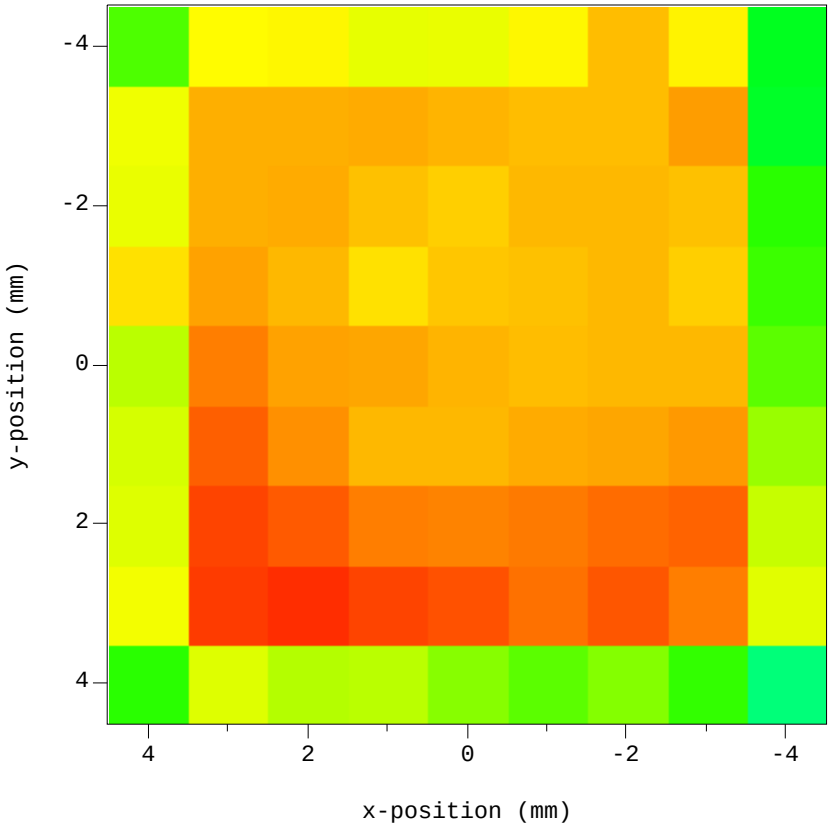
Dec. 13, 2013 APD 8x8 mm² **-1.85 kV ~1 MIP** spatial response map

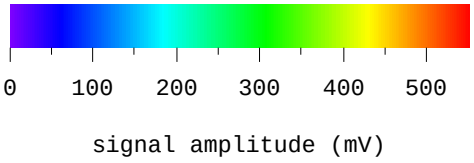
Al-mesh, Au sintered, s/n 432-6

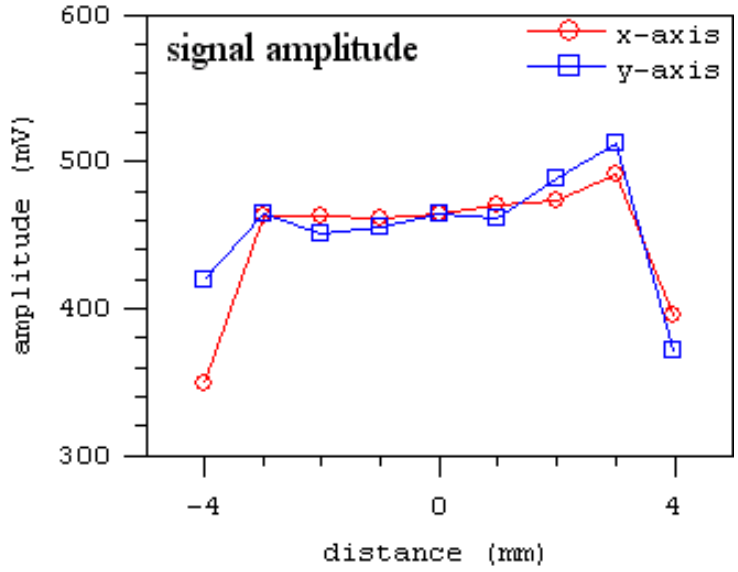


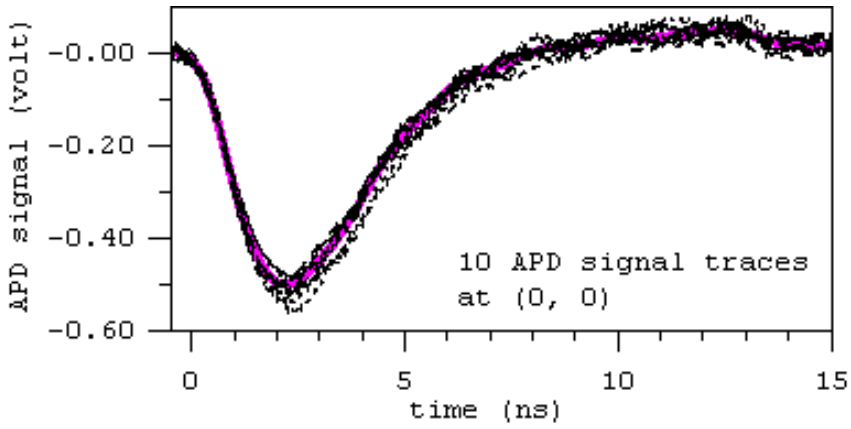
← + y-position

← + x-position



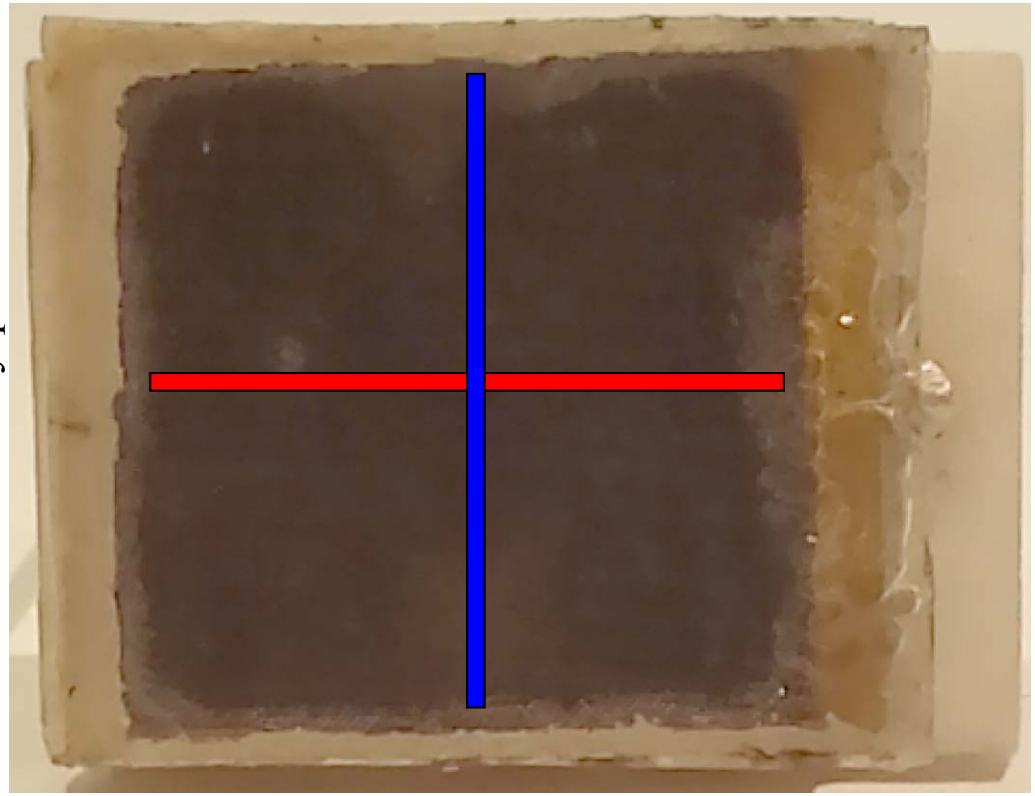


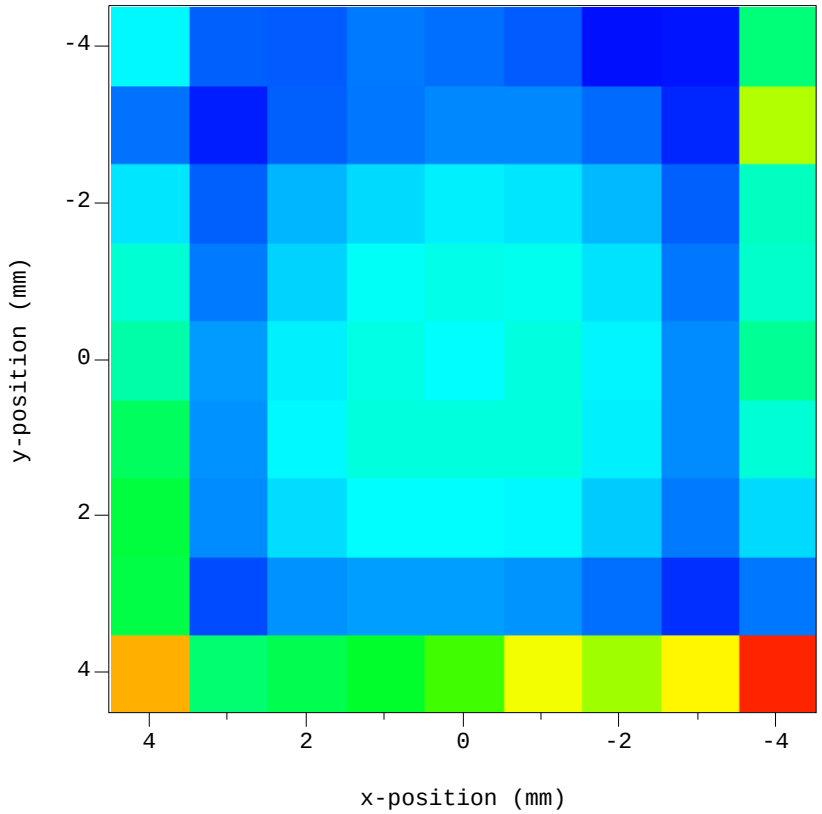


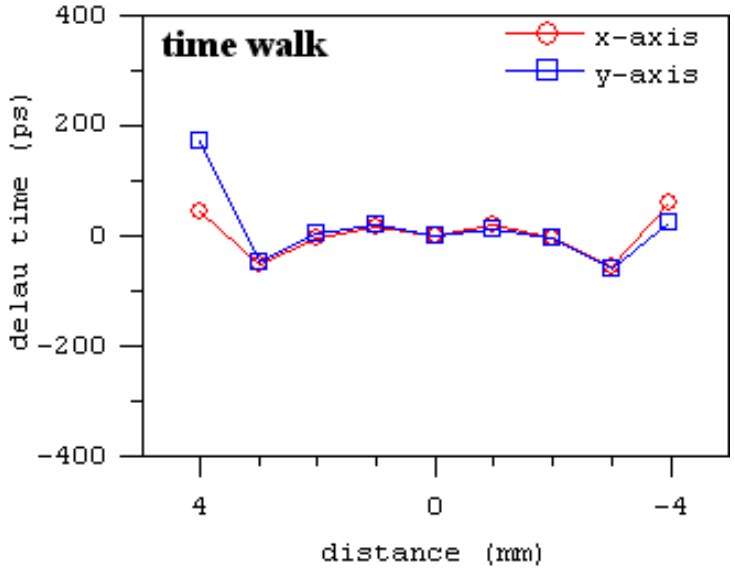


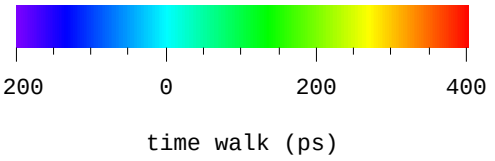
Dec. 13, 2013 APD 8x8 mm² **-1.85 kV ~1 MIP** time walk map

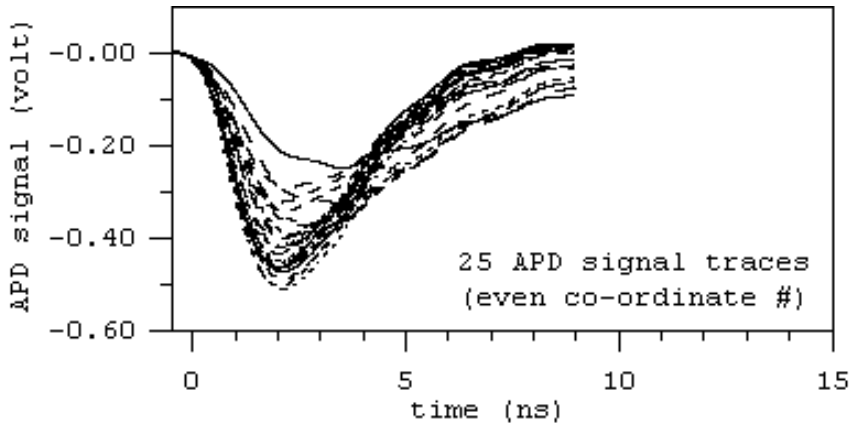
Al-mesh, Au sintered, s/n 432-6











Dec. 13, 2013 APD 8x8 mm² **-1.85 kV ~1 MIP** time jitter map

Al-mesh, Au sintered, s/n 432-6