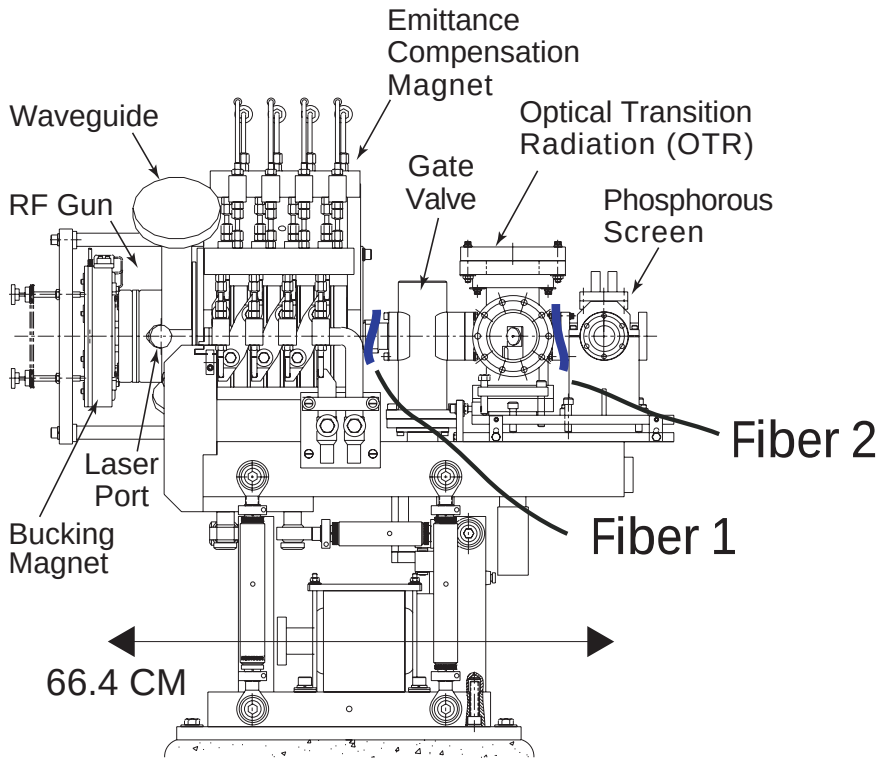
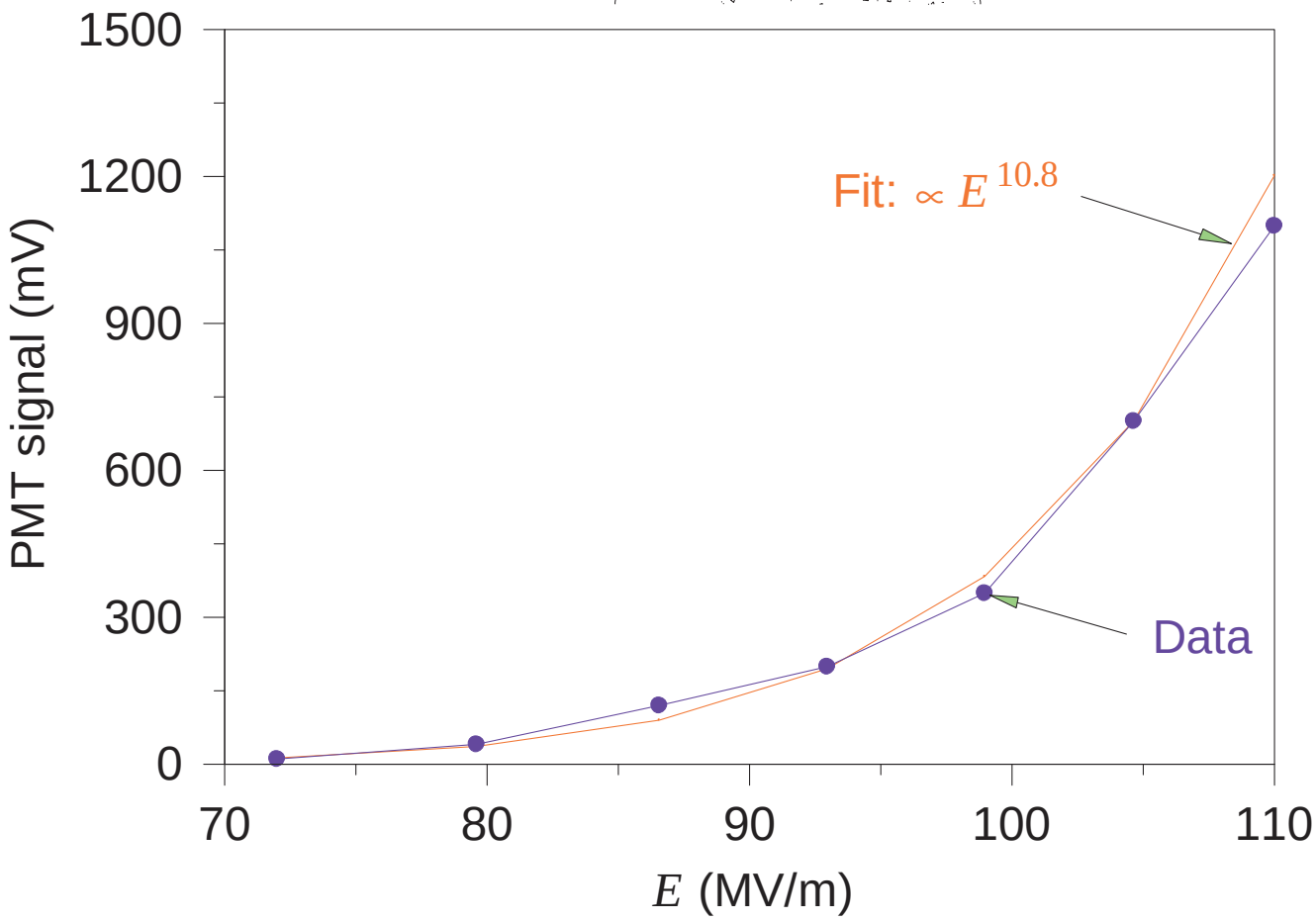
X-Ray Rates in Scintillating Fibers near High-Gradient RF Cavities at BNL and FNAL

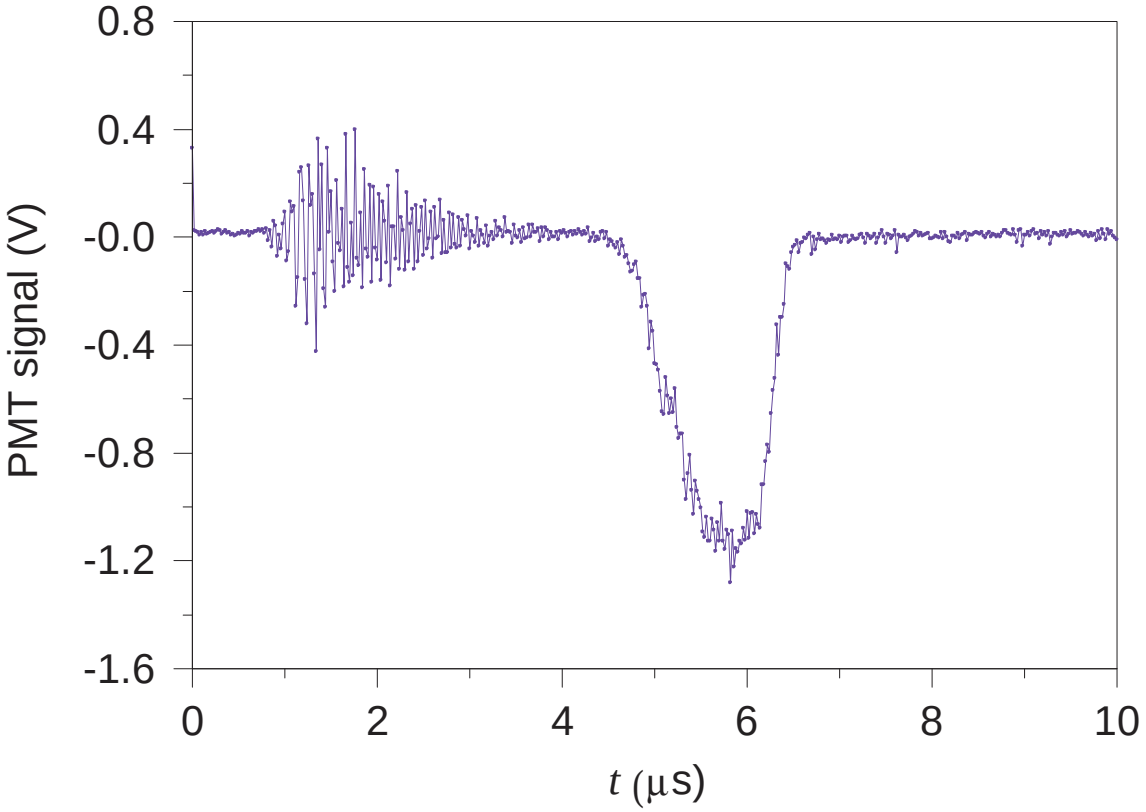
K.T. McDonald, Princeton University, July 16, 2001

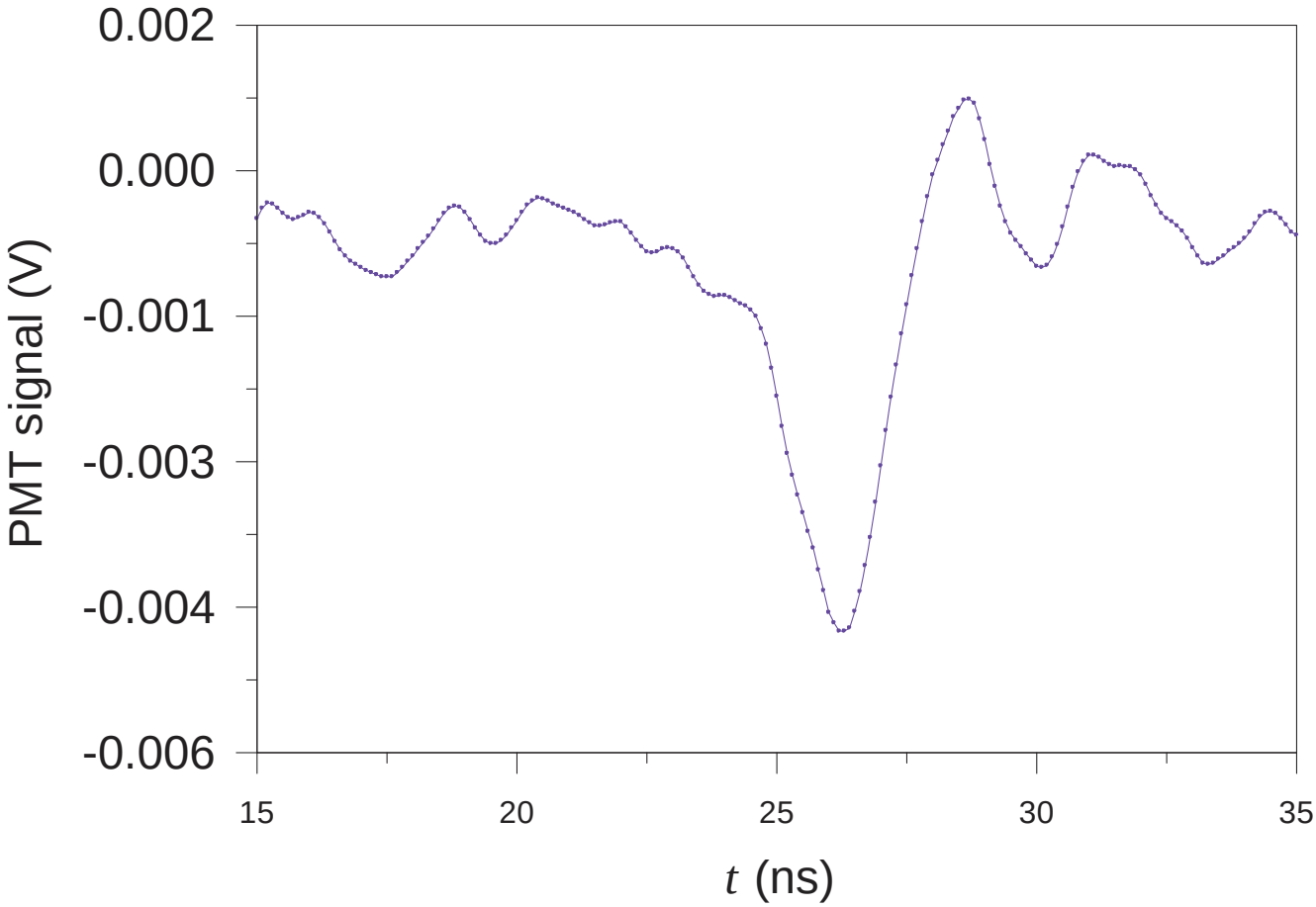
- Bicron BCF-12 1-mm-diameter scintillating fibers placed near 2 rf cavities at BNL and FNAL experienced overwhelming rates of x-rays.
- BNL: 2856 MHz, 110 MV/m, $\Rightarrow$ 1000 MIPS per 10 ns.
- FNAL Lab G: 805 MHz, 13 MV/m, $\Rightarrow$ 25,000 MIPS per 10 ns.
- The x-ray rate varied as $E^{10.8}$ in both cavities.
- $\Rightarrow$ Cannot do single particle diagnostics near such cavities unless the electric field is reduced, or the cavities are subject to successful surface treatment.

BNL ATF RF Gun






0.8
0.4
-0.0
-0.4
-0.8
-1.2
-1.6
PMT signal (V)
0
2
4
6
8
10
t (μs)


0.002
0.000
-0.001
-0.003
-0.004
-0.006
PMT signal (V)
15
20
25
30
35
t (ns)

FNAL LAB G 805 MHZ Rf Cavity