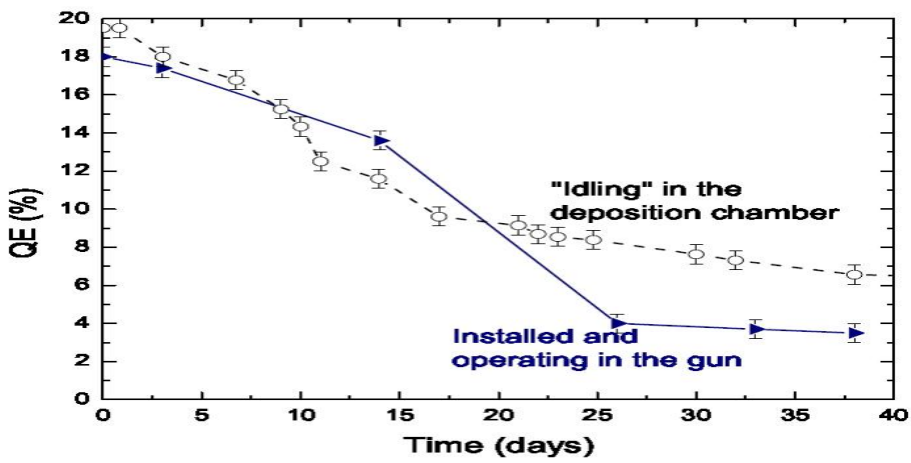
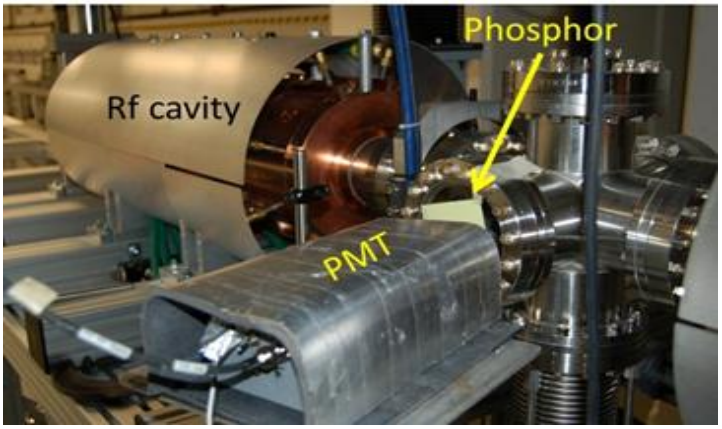
**HEP Highlight** **October 2013**

***The Drive Gun*** is now operational at the Argonne Wakefield Accelerator (AWA) facility at Argonne National Laboratory (ANL). The 1.5 cell, 1.3 GHz gun uses a Cesium telluride photocathode driven by a 248 nm laser to provide short-pulse, high charge electron bunches for the new 75 MeV drive linac. The high-gradient RF gun (peak field on the cathode > 84MV/m) is a key piece of the facility upgrade. The large area Cs2Te photocathode (diameter > 30 mm) is fabricated in-house. The photo-injector is capable of generating high-charge, short pulse, single bunches (Q > 100 nC) or bunch-trains (Q>1000 nC) for wakefield experiments, typically involving dielectric-loaded accelerating structures. The QE for the photocathode is plotted vs. time in the right-hand figure for two situations. The photocathode installed in the gun shows a promising QE lifetime, still near 4% in the gun after operating more than a month. Plotted for comparison is the QE lifetime of a photocathode "idling" in the deposition chamber before installation into the drive gun.




***Six normal conducting, standing wave, 7 cell, 1300 MHz accelerating cavities*** for the AWA linac upgrade have all been tuned to 1300 MHz and balanced to >96% in all cells.. They are designed to operate with 10 MW of rf input power but are being rf conditioned beyond this operating point to insure low dark current during operation. The first of the six cavities has been conditioned to 14 MW and dark current measurements were made. The remaining cavities will undergo rf conditioning soon and we plan to repeat dark current measurements for each cavity. Finally, we will record the breakdown rate at the operating power, P=10 MW, for each cavity. In the figure on the left we show the setup used to measure x-rays from dark current from the first rf cavity to undergo rf conditioning.

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