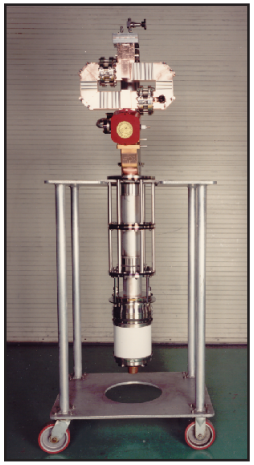
75 MW PPM Klystron

Supported by Extensive S-band Klystron Production at SLAC

- Over 700 Tubes Produced
- 65 MW for 3.5 μsecs
- Higher Beam Power (145 MW)
- Higher Average Power (41 kW)
- 60,000-100,000 Hour Lifetime

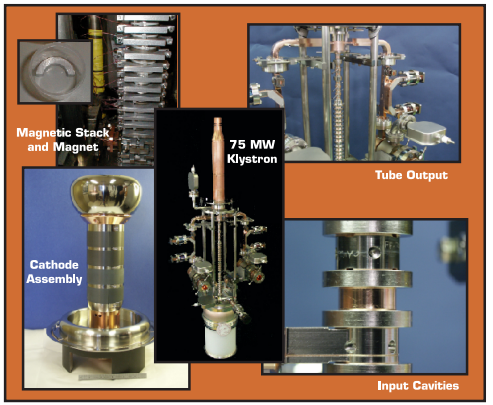


Based on 50 MW X-band Klystron

- 13 in Use at SLAC
- Over 100,000 Operating Hours
- No Discernible Failure Mode
- Same Beam Power/Pulse-width
- Mechanical Differences are:
  - Single Window Only
  - Solenoid-focussed

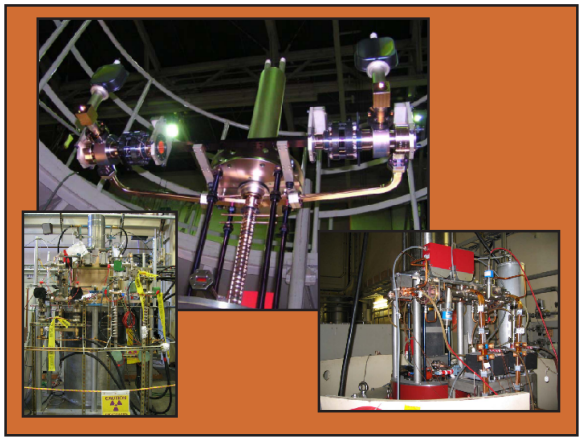
75 MW Mechanical Design

- Larger Gun Assembly (higher voltage)
- Two Windows (more robust)
- Integral Polepiece Body (like TWT)
- One More Cavity in Output



75 MW Suppliers

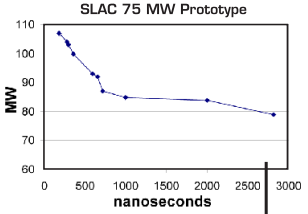
- All KEK Tubes from Toshiba
- Prototype Tube from EEV
- One CPI/SLAC Klystron
- Balance of Tubes from Klystron Factory at SLAC
- External Suppliers Limited by Funding



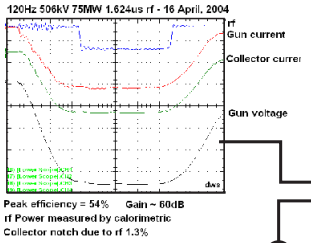
75 MW Performance

- Full Specification Performance by Two Tubes
- Only Two Full-spec Modulators for Testing – at SLAC

SLAC 75 MW Prototype

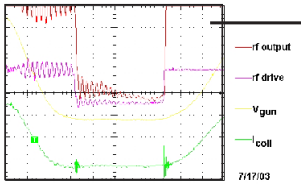


SLAC XP3 S/N 4



SLAC XP3 S/N 3

75MW, 120Hz, 1.6us, 511kV,
5.6% notch, 53% eff, not saturated.



Klystron Performance Summary

Klystron	Peak Power	Pulse-Width	Repetition Rate
SLAC XP3 S/N 4	75 MW	1.6 μs	120 Hz
SLAC XP3 S/N 3	75 MW	1.6 μs	120 Hz
KEK PPM S/N 2	75 MW	1.7 μs	60 Hz
	68 MW	1.7 μs	120 Hz
KEK PPM S/N 3	65 MW	1.5 μs	50 Hz
KEK PPM S/N 4	75 MW	1.6 μs	25 Hz
SLAC 75 MW Prototype	75 MW	1.5 μs	1 Hz
	79 MW	2.8 μs	1 Hz
KEK PPM S/N 1	68 MW	1.5 μs	5 Hz
SLAC 50 MW	50 MW	1.5 μs	120 Hz
	55 MW	2.4 μs	60 Hz
	75 MW	1.5 μs	120 Hz
Specifications	75 MW	1.6 μs	120 Hz

Notes: Modulators Limited to 50 Hz
Initial Tubes Not Designed for High Repetition Rates