

SRS and ERLP developments

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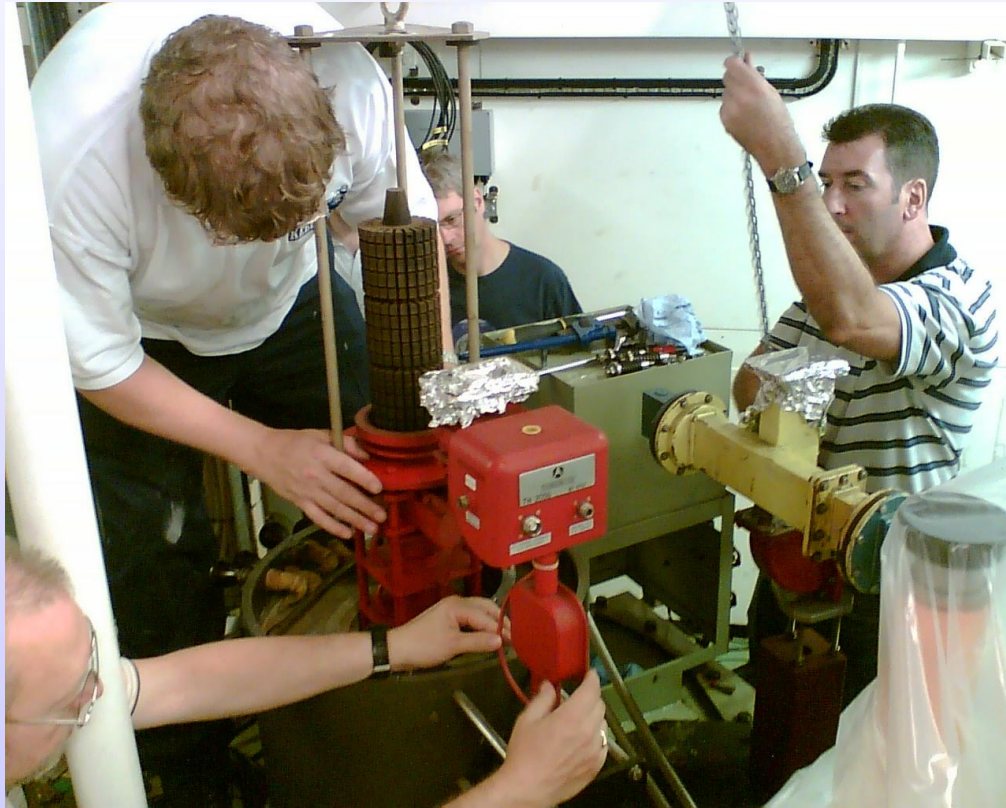
- SRS Status
 - Latest news
 - Major faults
 - Status
- Energy Recovery Linac Prototype
 - Latest news
 - Status of the RF system
 - Status of the cryogenic system

- Machine currently recovering after a major shutdown
- New Thales 250KW klystron awaiting acceptance test at the Thales factory
- New 6MW pulse klystron will be ordered for the LINAC after failure of a tube with >20 years use
- Decision to close SRS facility December 2008

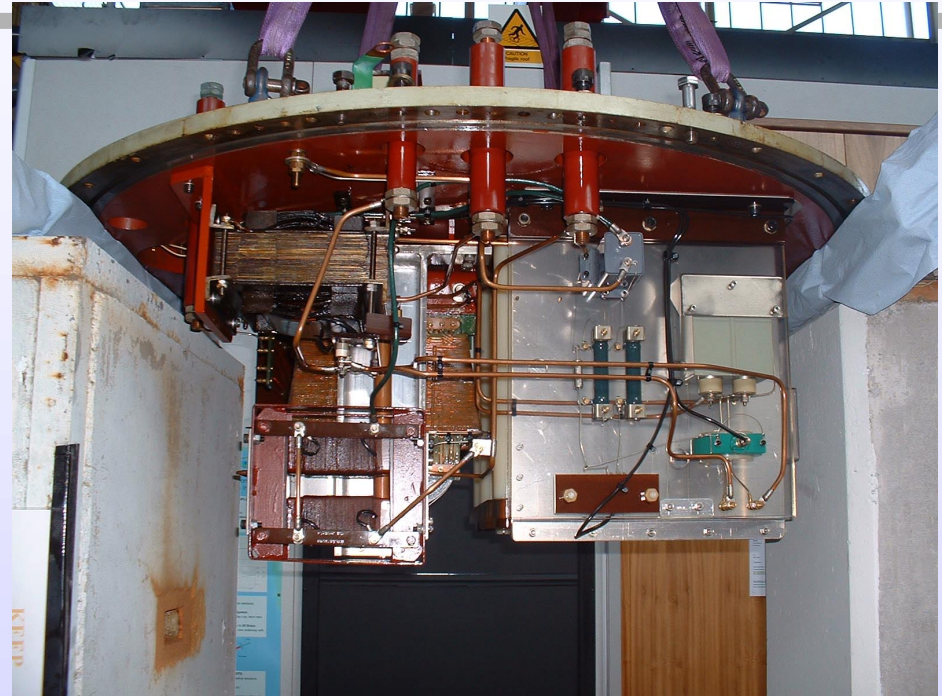
- In march 06 water was seen on RGA scans of sector 9 of the SRS machine
- Investigations found an a TVM absorber in port 9 had failed
- Inspections revealed that a third of the machine needed to be vented for cleaning
- SC Wiggler 9 beam tube was found to be full of water and was baked insitu

- 4 month recovery program was put in place
- Many events of this type are now appearing on this old machine, at least a major vent every year
- Water is boring holes in pipes, particularly at elbow connectors
- Water is now the number 1 failure in the SRS machine

- Thales TH2056 pulse klystron 3GHz 6MW
- Late July 06 arcing was evident from the HT tank through Perspex window
- Fault went hard with shorts on secondary and primary of the HT pulse transformer
- Nobody had seen inside the HT tank



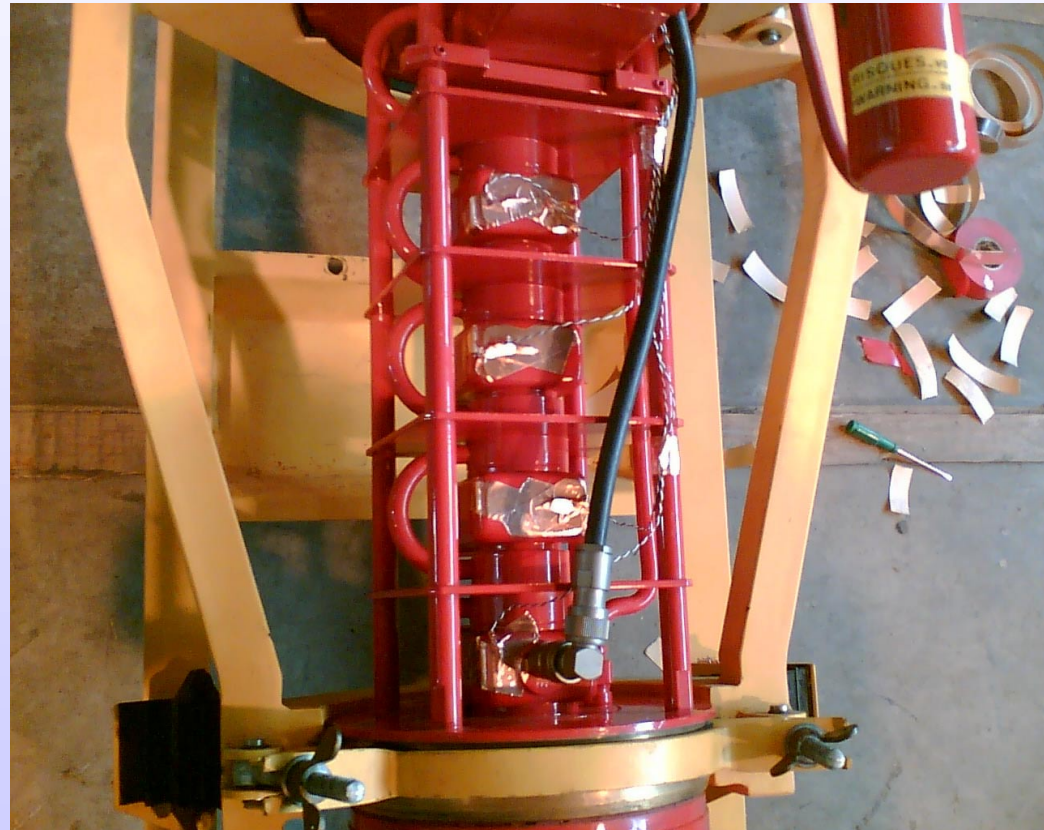
- Insulating oil was found to be very wet
- Explosions in the oil had blown two conductors together causing the shorts on the transformer
- Every component was thoroughly tested before being refitted
- Detailed notes were made of how the 25 year old tank was constructed



- Transformer was refitted to the oil tank and the system vacuum filled (no air bubbles!)
- No data for 20 year old 'new' klystron focus coils
- Refitted used klystron and brought on slowly
- Although tube worked the output was low
- During optimisation experiments the filament went open circuit



- New klystron fitted using focus setup from previous tube
- Thermocouples placed on each cavity to monitor for heat
- Klystron produced $>2\text{MW}$ of RF at lowest HT setting
- Current LINAC performance is better than it has been for > 10 years
- New tube will be ordered
- (55k EURO)



SRS Status 18:07:05 21 Sept

Current: **125.7 mA** Lifetime: **17.7 Hrs**

Energy: **2.0 GeV**

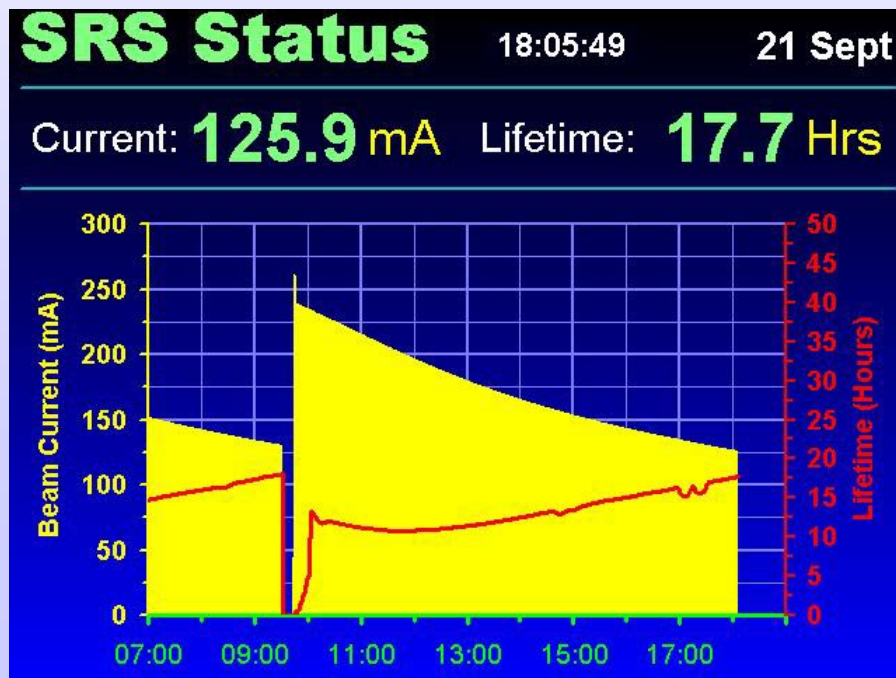
IDs:

MPW6	MPW10	MPW14
2.0 Tesla	2.4 Tesla	2.0 Tesla
WIG9	WIG16	U5 VPU
5.0 Tesla	6.0 Tesla	HLP

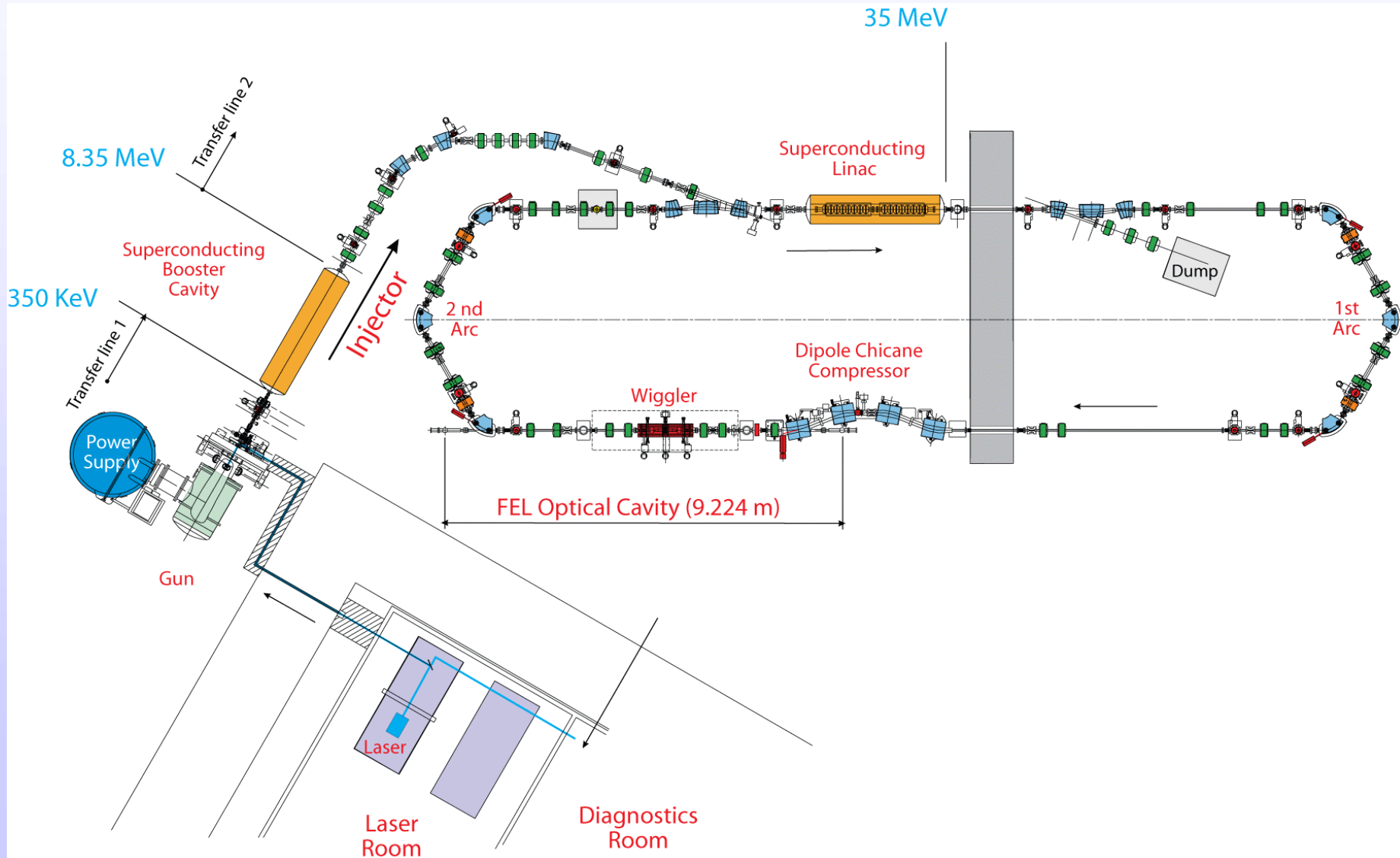
Ports:

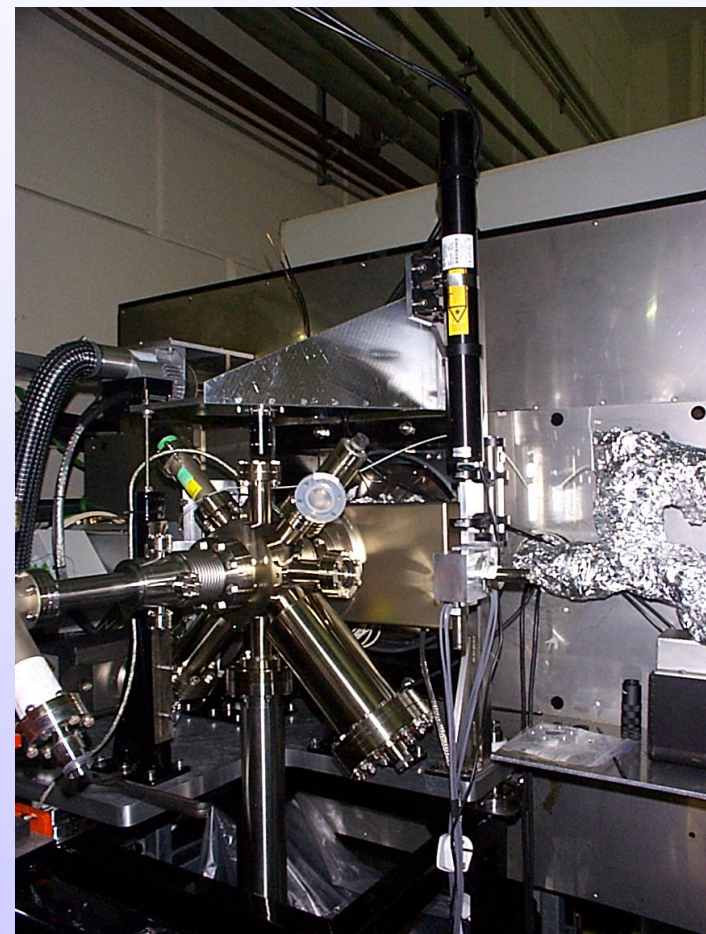
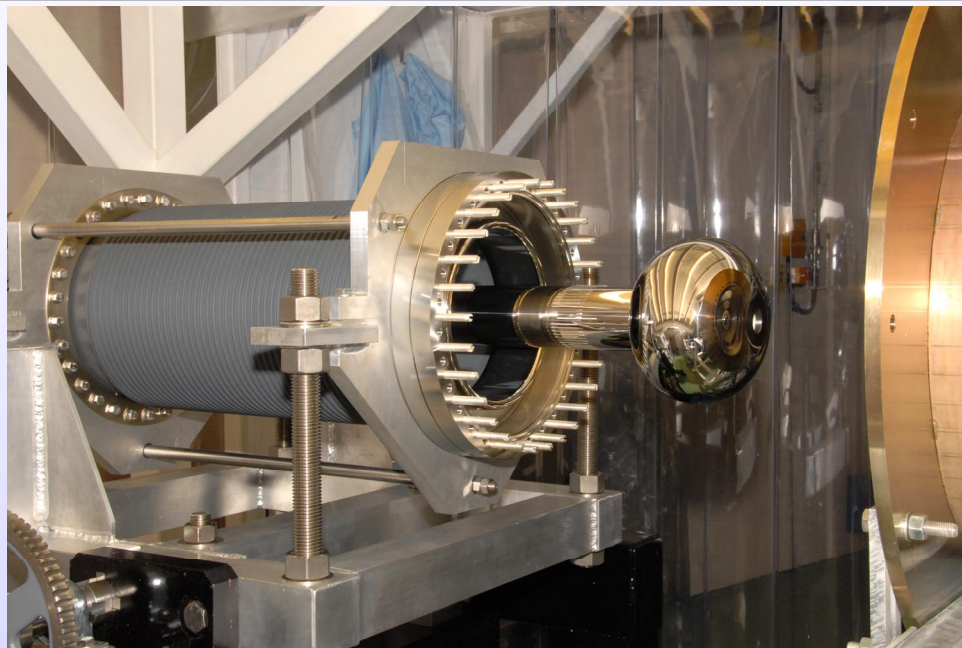
1	2	3	4	5	5U	6	6W	7	9
10W	11	12	13R	13D	14W	16A	16B	SLM	

Gapped User Beam
 Global H&V Servos Active
 Next Scheduled Refills 21:30_08:30 Hrs.



- Operation since 20th August
- Vacuum recovering
- 3 Fills per day
- 97 % uptime

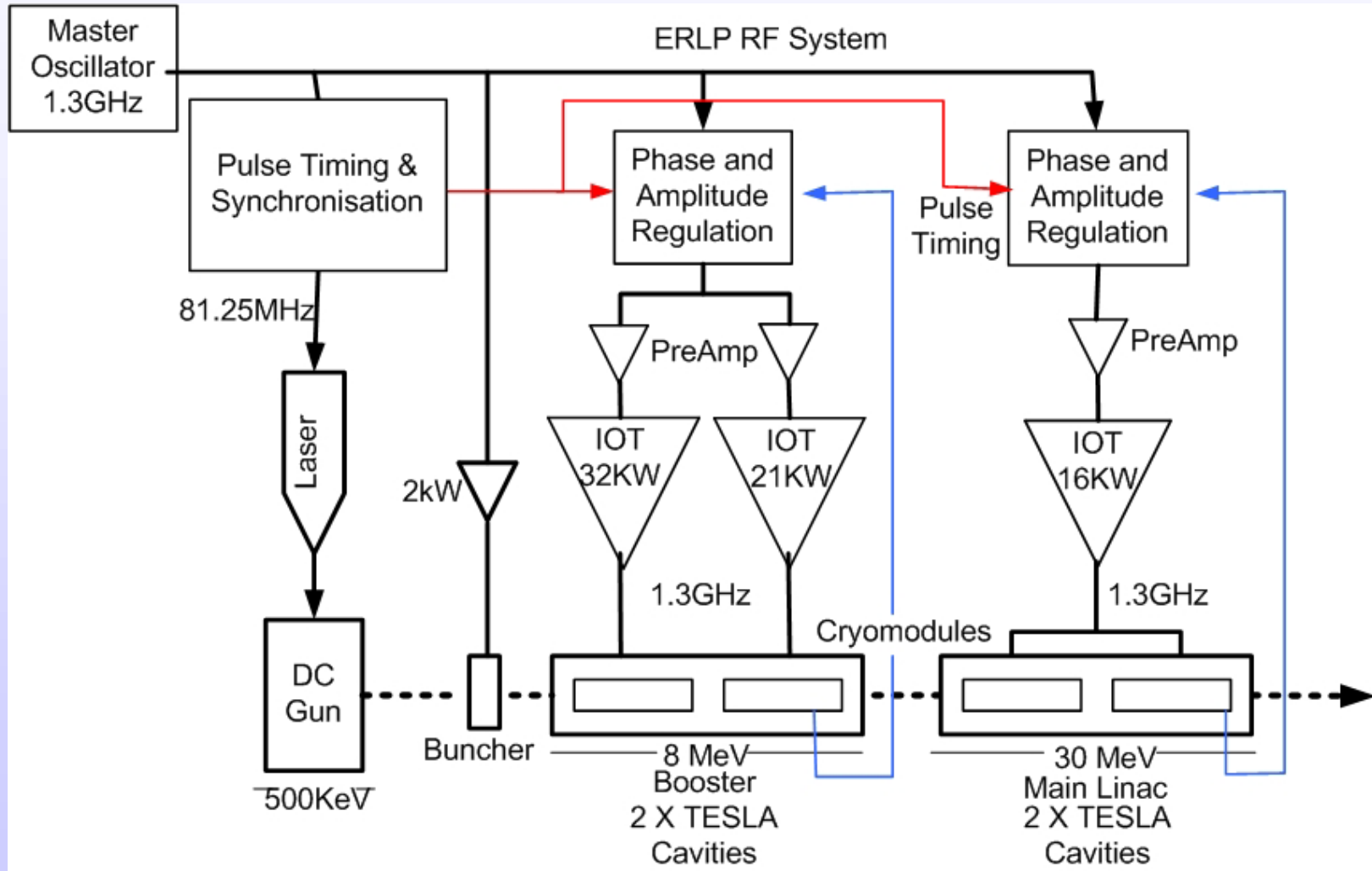




- Jlab design, DL manufactured gun, commissioning has been in progress since July
- 500KV DC power supply
- GaSa cathode
- 81MHz CW laser at 532nm (Mechanically chopped)
- 100uS pulse delivered to cathode to produce 80pC electron beam = $< 4\text{mW}$

- Wednesday 16th August electrons were seen at the first YAG screen
- 350KeV 5pC using only 5% of the available laser power (target 80pC)
- 100uS 20Hz

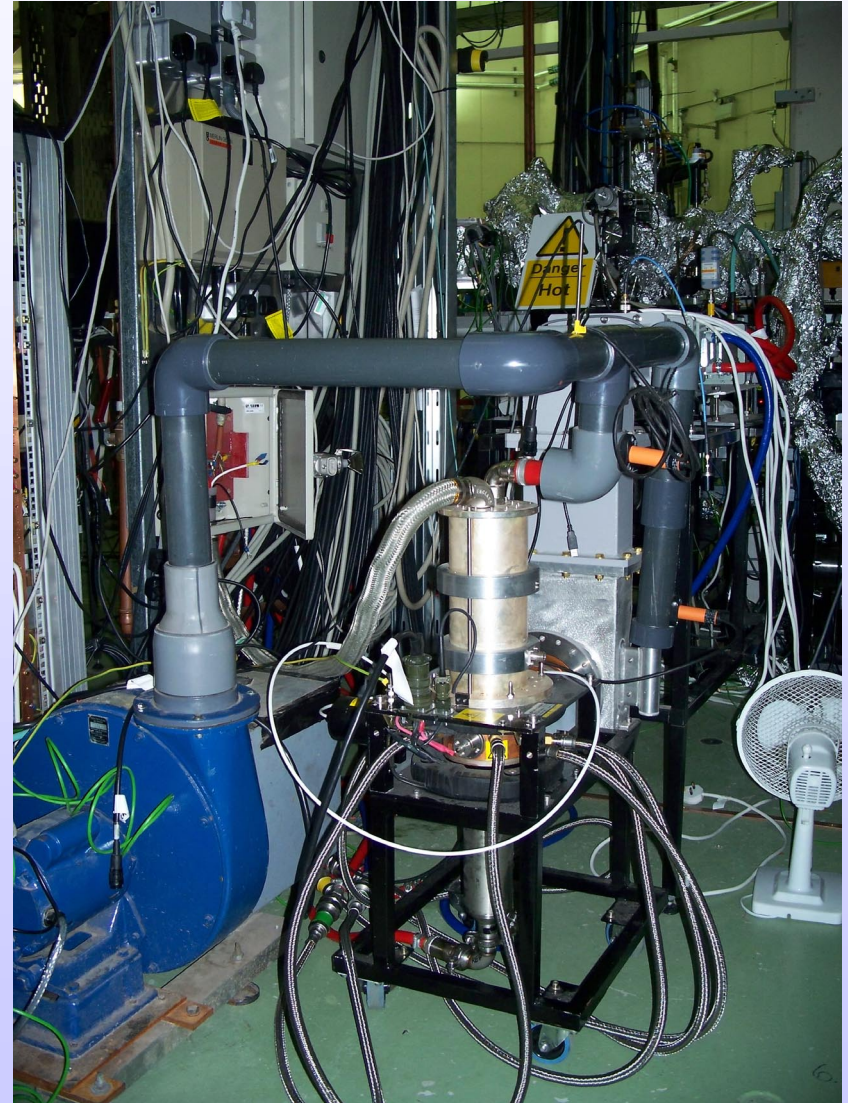




- 1.3GHz Buncher
 - 2.5kW solid state amp
2mS 20Hz
 - Temporary IOT limited
to 3KW
 - Issues with getting
power level through N
type connector



- Due to external Q issues and CW limits of the module couplers, radical redesign has taken place
 - Cavity 1 will be powered by 2 16KW e2v combined IOT's (32KW)
 - Cavity 2 will be powered by a single CPI IOT at 21KW
- Pulse mode operation 12mS 20Hz
- Booster will be at 2K ready for RF tests by end of October 06



- e2v 16KW IOT will be split to power both Linac cavities
- One LLRF control loop (Rossendorf)
- Pulse mode to start followed by CW tests
- Module will be at 2K ready for RF tests by the end of October 06
- Single HT PSU for IOT's



- First cryomodule delivered May 06, second June 06 – very late !
- Linde 4k system commissioned July 06
- Helium transfer lines installed by Demaco Sept 06
- Linde 2K commissioning now



- 2K system will be available very soon
- 2 IOTs will be available for high power RF commissioning October/early November
- Gun Diagnostic beamline commissioning November 06
- February 07 beam accelerated around the machine
- Spring 07 energy recovery
- 4GLS TDR starts October 06