

# SRS Power Supply Recommisioning

## Background

- The Daresbury SRS was the worlds first dedicated Synchrotron Radiation Source.
- Entered service 1980.
- Designed in the 70's utilising established technology.
- HV Power Supply replaced 12 months ago.
- No significant RF failures since PS replacement.
- Plan to recommision “old” power supply in NSF Tower as HVPS for ERLP/RF Test Area.

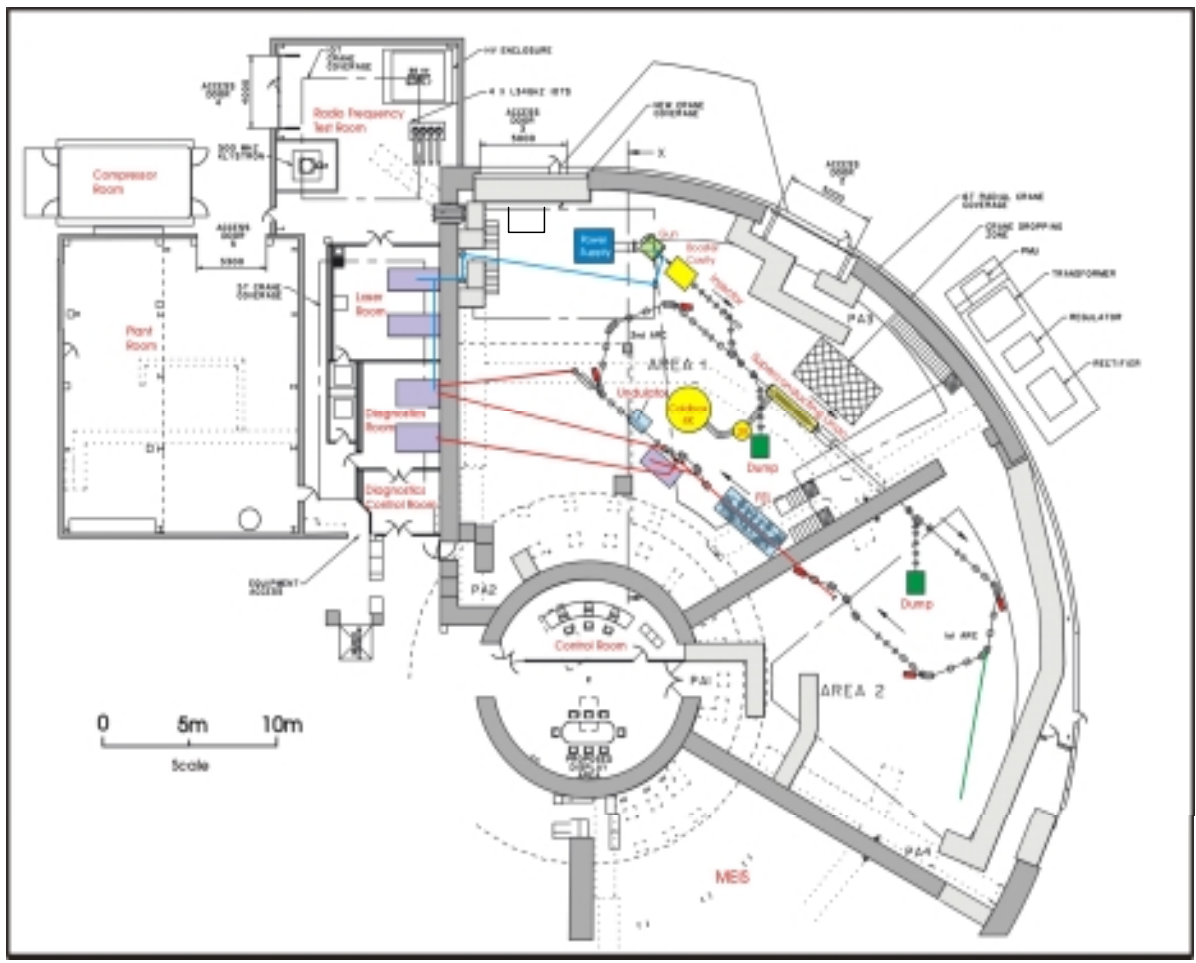


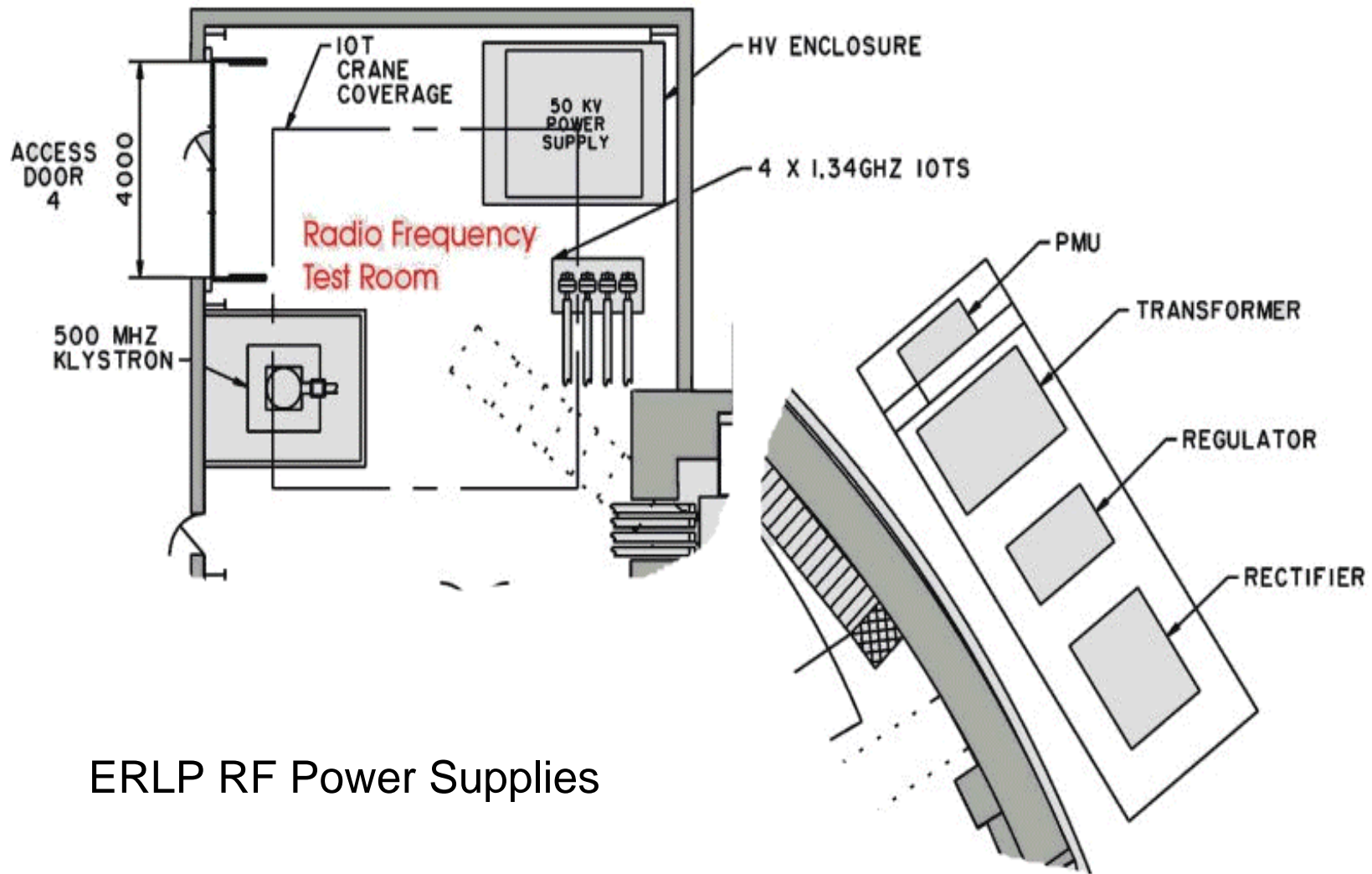
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## Potential Uses for Refurbished Power Supply

- Energy Recovery Linac Prototype (ERLP).
- Testing EU Cavity.
- Testing Cornell 200 KW cw Coaxial Couplers.
- Testing E2V prototype 1.3 GHz IOT.
- Supporting 4GLS.
- Supporting other Research Establishments.

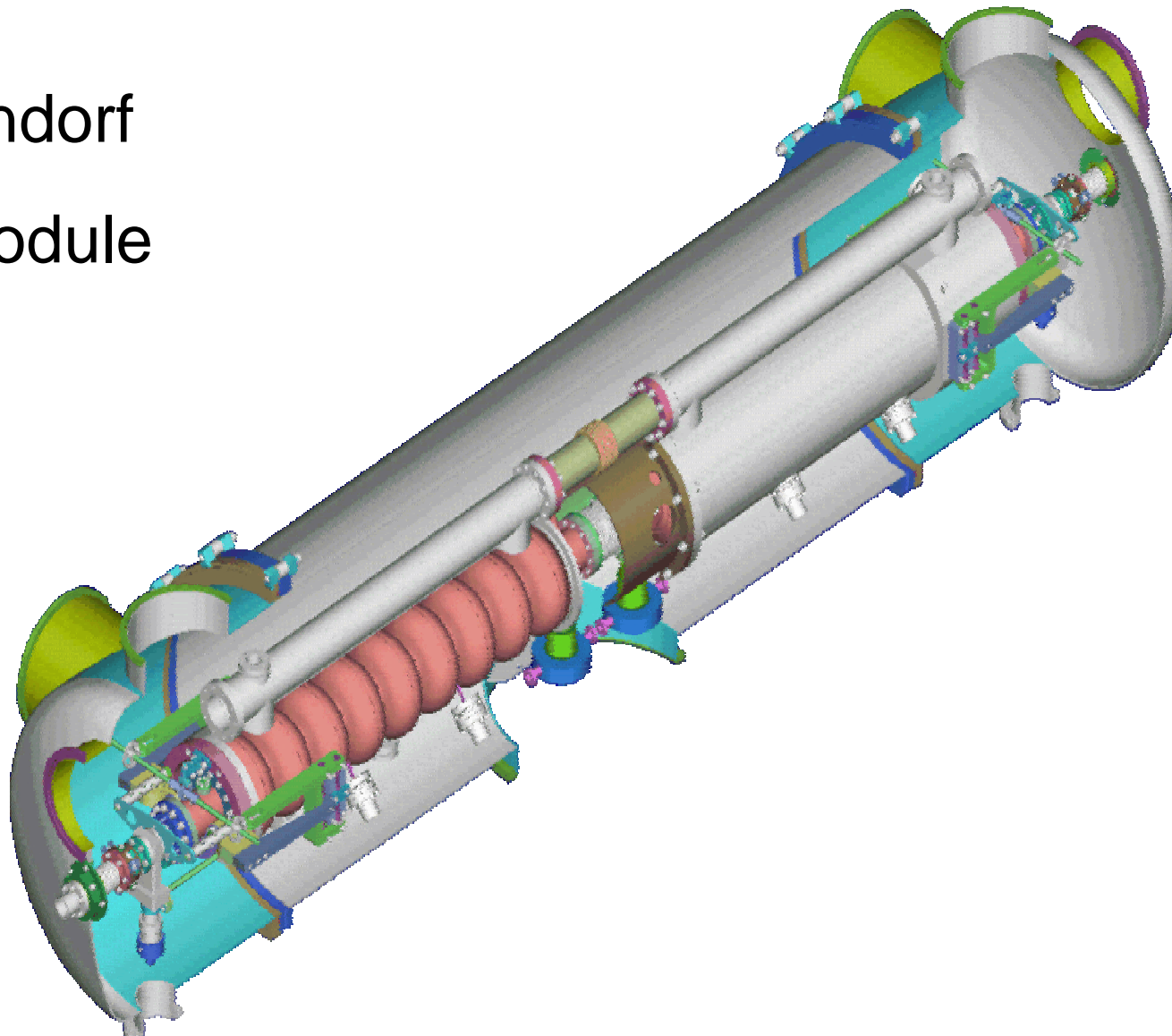
### ERL Prototype Layout 180/10020 C





ERLP RF Power Supplies

# Rossendorf Cryomodule



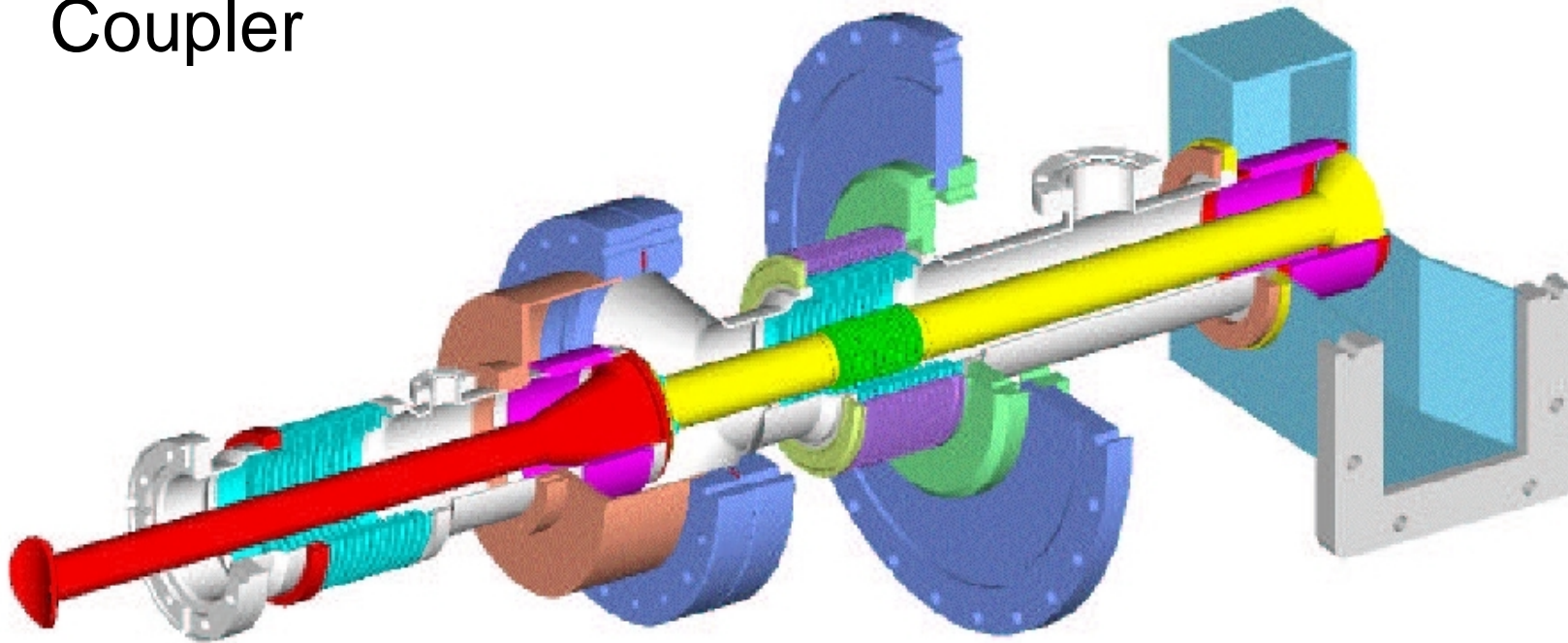
# EU Cavity



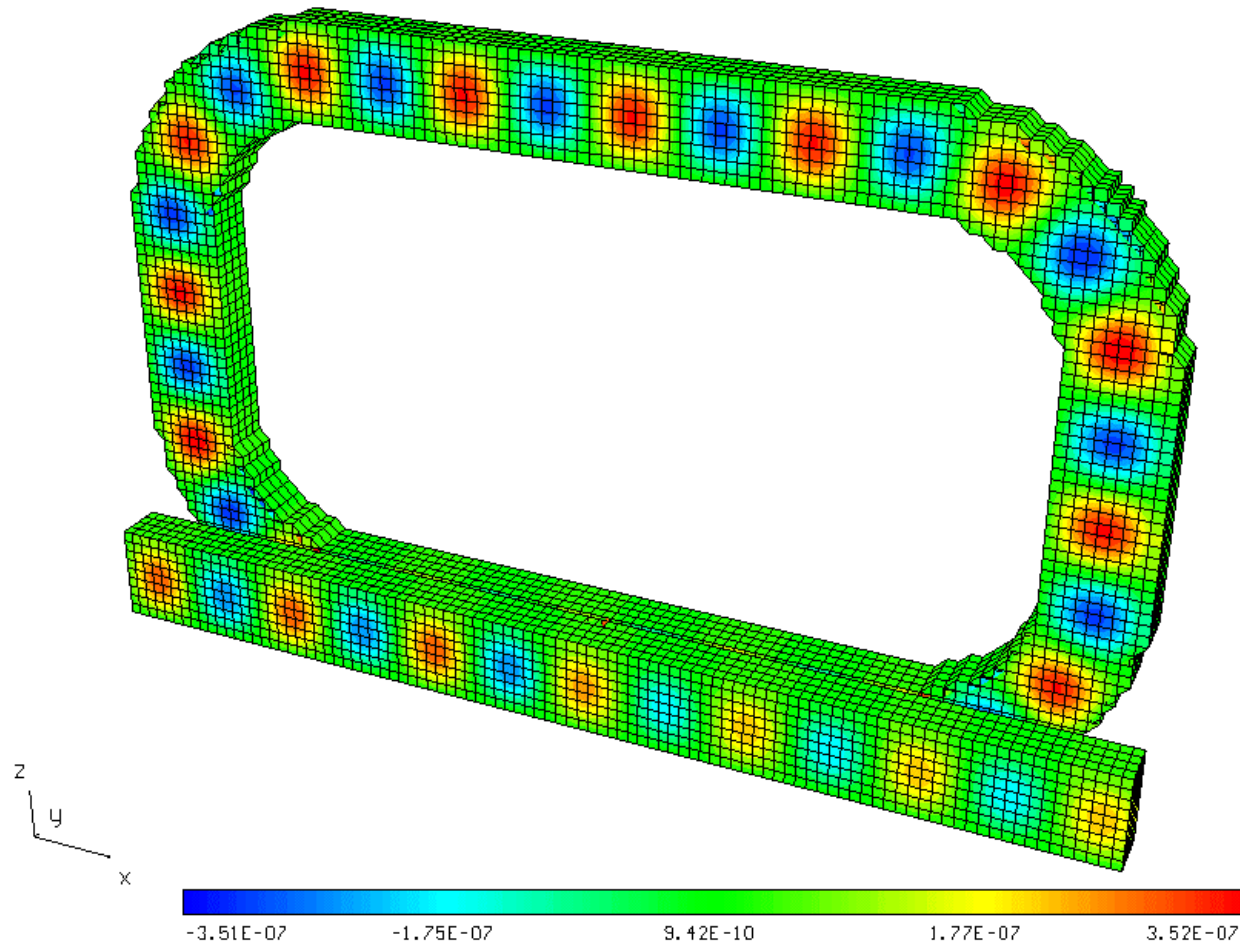
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# Cornell Coupler

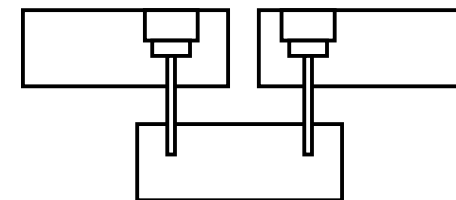
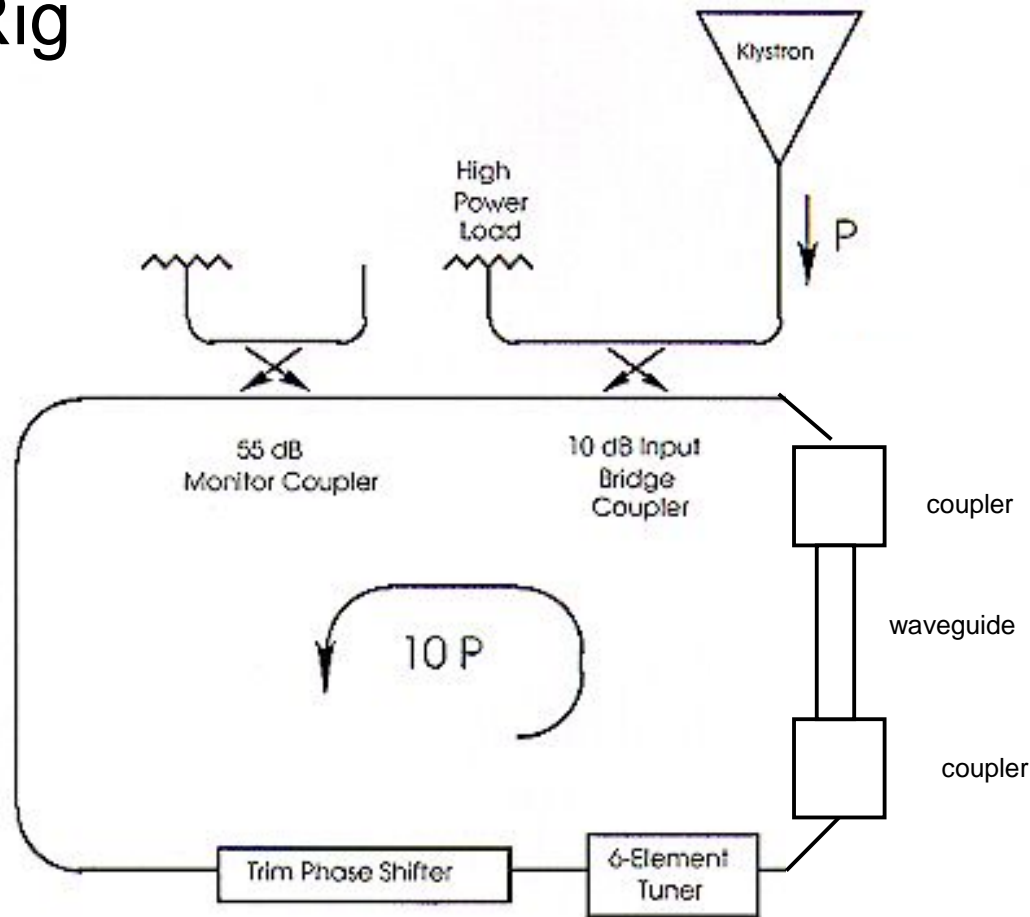


# Resonant Ring



# High Power Coupler

## Test Rig

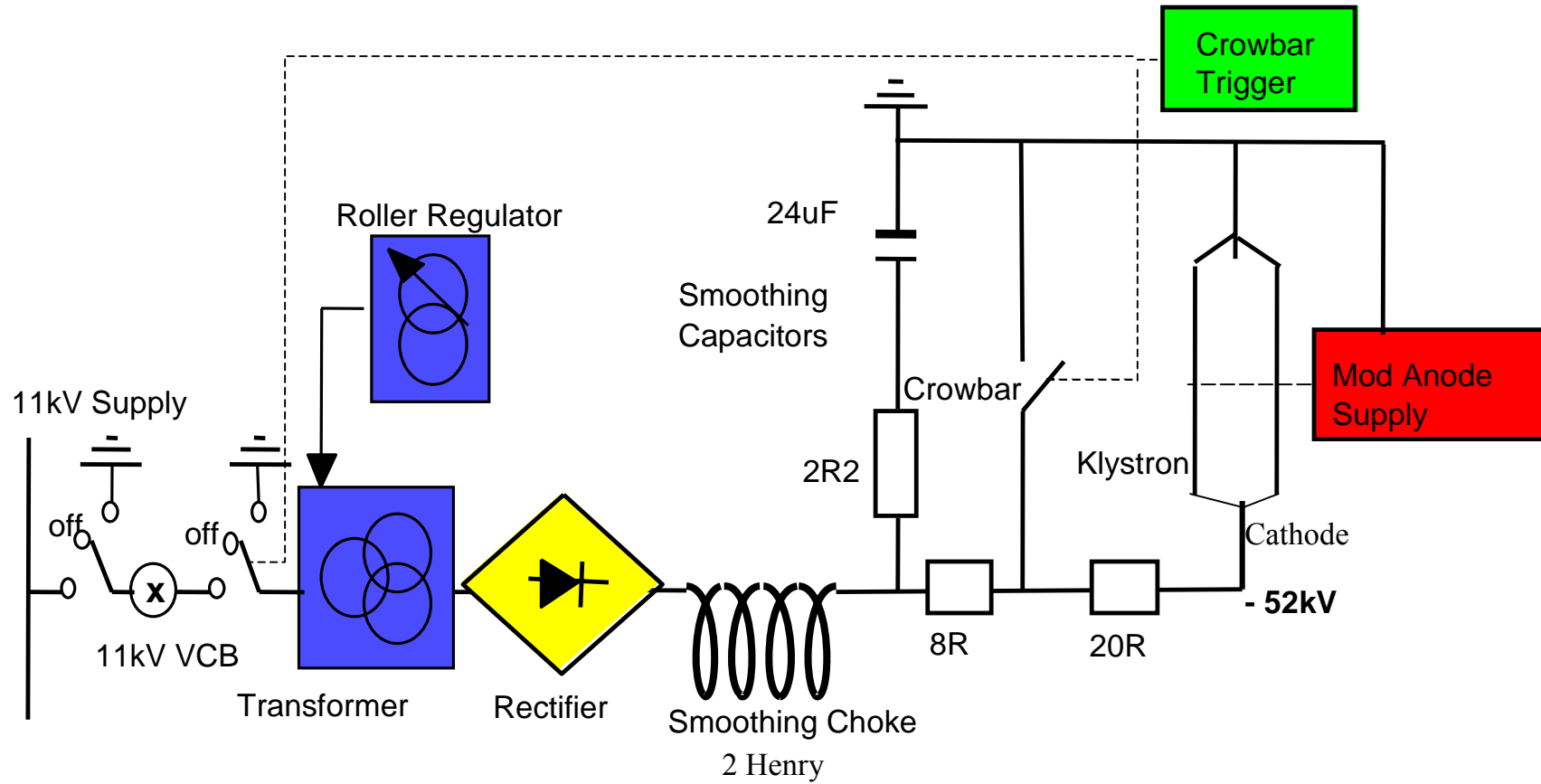


## Problems identified during SRS operation.

- Mod Anode; Voltage controlled via triode, suspected of causing RF trips.
- Crowbar System; spurious operation of crowbar during normal operation.
- Control system; Relay logic system, reliability suspect towards end of operational life.
- No significant RF problems since replacement of SRS HVPS by Thales PSM Power Supply, 12 months ago.



Thales PSM Power  
Supply installed in  
Daresbury SRS.



# Power Supply Upgrade.

- Replacement of Mod Anode Circuit by a Potential Divider, less efficient but reliable and cost effective.
- Replacement of Crowbar, probably with Thyatron or Solid State Switch Crowbar.
- Replacement of obsolescent relay logic system with flexible and expandable PLC system.
- Well planned upgrade should lead to a versatile and reliable PS with a potentially long service life.

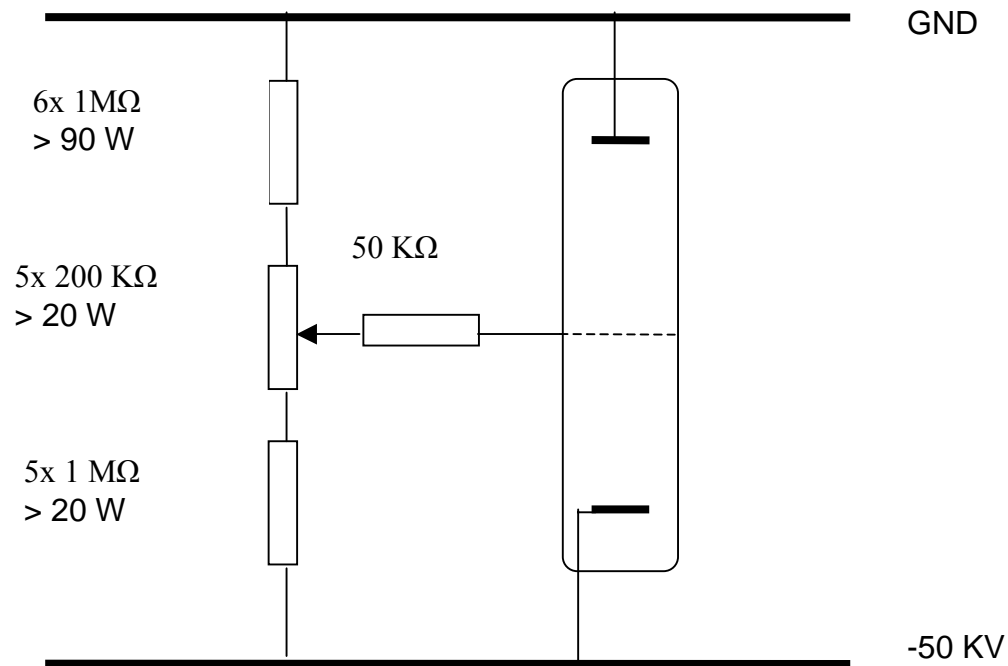


# Possible Crowbar Types.

- Fast Opening Switch (not crowbar).
- Thyatron Crowbar.
- Spark Gap Crowbar.
- Thyristor Crowbar.
- Re-use existing Ignitron Crowbar, with crowbar triggering unit upgrade.



- Mod Anode potential divider



# Control System

- Siemens PLC system chosen to be standard throughout Daresbury Laboratory.
- Fully automated, and able to interface into EPICS ERLP control system via industrial ethernet module.
- Flexible and expandable, this is a significant advantage given the multipurpose role of the HVPS.

# Conclusions.

The old SRS HVPS is a capable power supply utilising dated technology. If the upgrade is well thought out it, should provide Daresbury Laboratory with a cost effective and versatile facility. The primary role of this will be as a HVPS for the ERLP. However, in the future it will be supporting various projects, EU cavity, 4GLS, SRS etc. It will provide a 500 MHz and 1.3 GHz RF Test Facility which will be a useful research asset on a global scale.

Thanks to;

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