The power supplies system for 10MeV/20kW industry irradiation facility
10MeV/20kW industry irradiation facility (IIF) has been designed by National Synchrotron Radiation Laboratory (NSRL) for years. Modular design power supplies are employed for the latest version, depend on the performance of these power supplies with high precision and high stability, the operating reliability of the IIF has been greatly improved.
POWER SUPPLY SYSTEM

- IIF Power supply system
# POWER SUPPLY SYSTEM

The details of the power supply system

<table>
<thead>
<tr>
<th>Type</th>
<th>PS Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unipolar DC PS</strong></td>
<td>Focus solenoid for accelerating tube</td>
<td>30A/60V</td>
</tr>
<tr>
<td></td>
<td>Corrector magnet</td>
<td>10A/10V</td>
</tr>
<tr>
<td></td>
<td>E-gun Filament-heater</td>
<td>2.5A/6.3V</td>
</tr>
<tr>
<td></td>
<td>Thyratron filament-heater</td>
<td>100A/15V</td>
</tr>
<tr>
<td></td>
<td>Thyratron hydrogen</td>
<td>20A/15V</td>
</tr>
<tr>
<td></td>
<td>Focus solenoid for klystron</td>
<td>40A/120V</td>
</tr>
<tr>
<td><strong>Bipolar PS</strong></td>
<td>Scan magnet</td>
<td>±10A/37Hz</td>
</tr>
<tr>
<td><strong>Pulse PS</strong></td>
<td>Grid-controlled pulse</td>
<td>+300V/pulse;-100V/DC bias</td>
</tr>
<tr>
<td><strong>Modulator</strong></td>
<td>For klystron</td>
<td>130kV/500Hz/16us</td>
</tr>
<tr>
<td><strong>Inverter PS</strong></td>
<td>AC klystron filament-heater</td>
<td>AC 3A/220V</td>
</tr>
<tr>
<td><strong>High Voltage PS</strong></td>
<td>E-gun HV</td>
<td>DC 45kV/200W</td>
</tr>
<tr>
<td></td>
<td>Ion HV</td>
<td>DC 7kV/400W</td>
</tr>
</tbody>
</table>
POWER SUPPLY SYSTEM

- **Unipolar DC power supply**
  - 14 unipolar DC power supplies
  - stability better than 200 ppm
  - MTBF $\geq$ 50000 hours.
POWER SUPPLY SYSTEM

- Bipolar power supply for scanning magnet

- 37Hz & ±10A

- Time to respond to failure ≤ 200ms
• **Power supply for DC electron gun**

- rising edge <10ns
- the falling edge <42ns
• Modulator and DC-AC inverter power supply

- Linear modulator
- DC-AC inverter power supply
• High Voltage Power Supply

- LLC circuit
- Voltage doubling circuit
The power supply system is used in IIF already, by use the modular design and the commercial products, MTBF is significantly improved and the debugging period is reduced.
REFERENCES

THANKS

E-mail: shangfl@ustc.edu.cn