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RITS-6 Low Impedance MITL and Output Pulse Modifications

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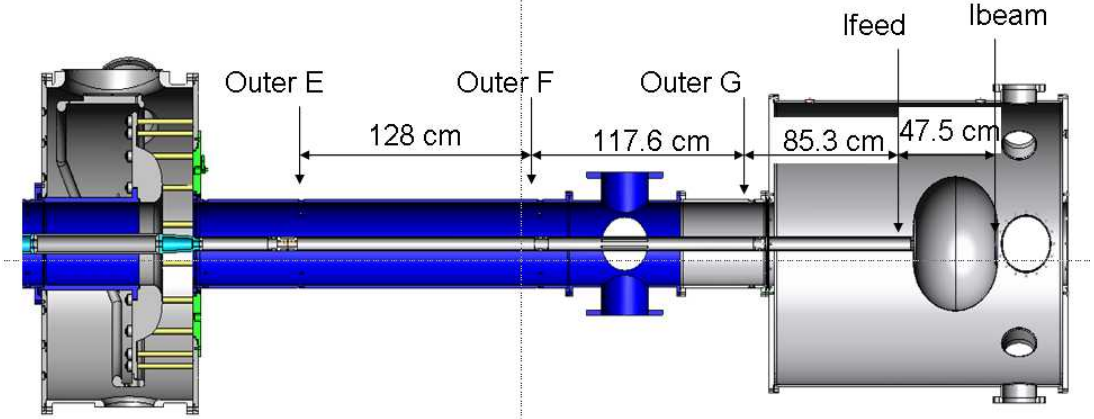
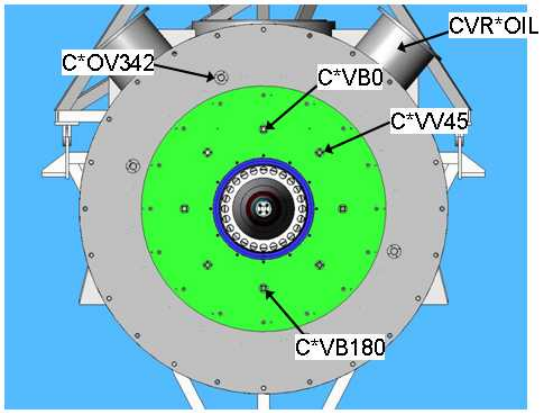
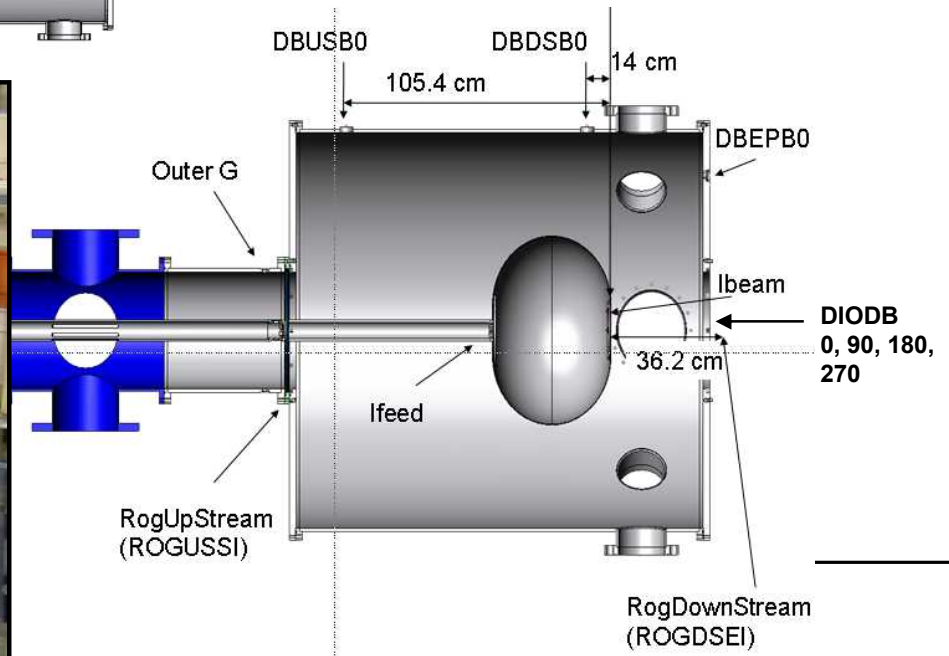
Summary of RITS-6 Electrical Diagnostics





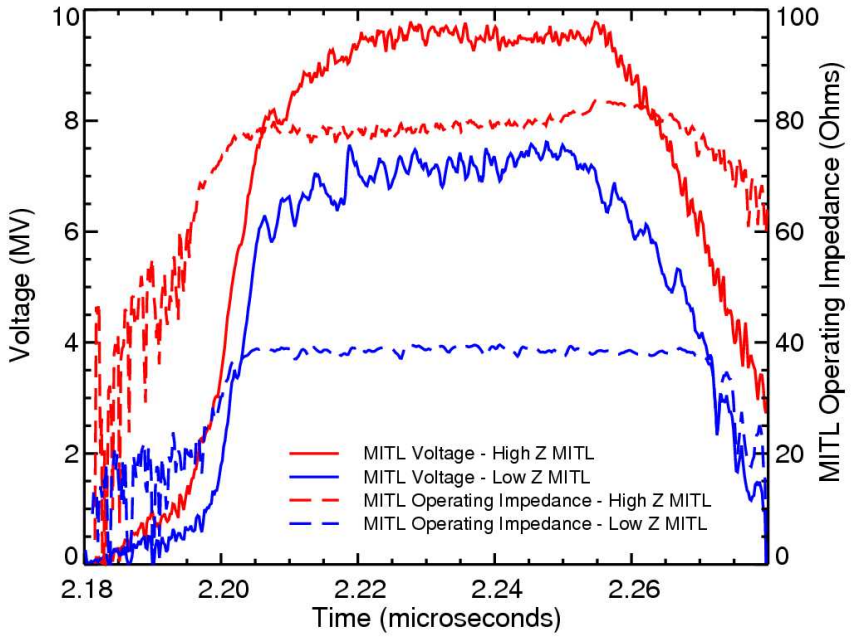


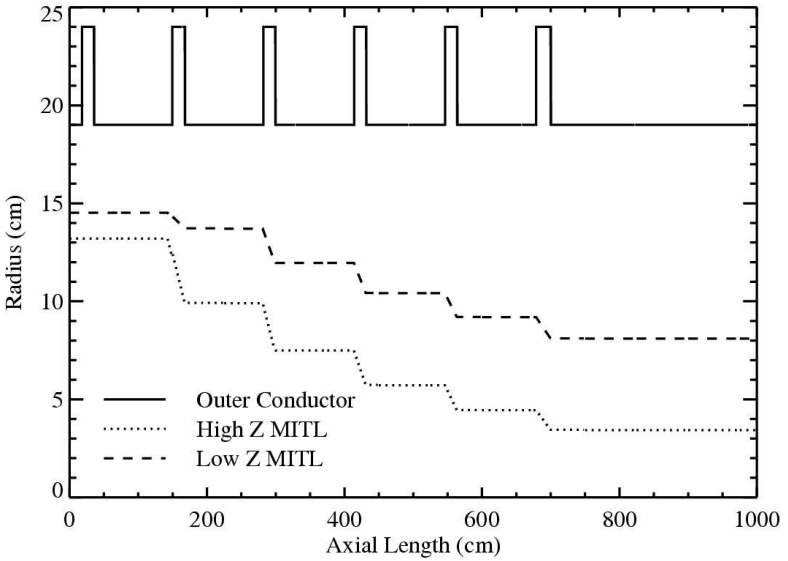
Two MITLs with different impedances have been tested on RITS-6

- **High Z MITL – 240 shots**
- **Low Z MITL – 103 shots to date**

MITL parameters for 90kV Marx charge

	High Z MITL	Low Z MITL
Final Z_{vac}	102.8 Ω	51.3 Ω
Final Z_{op}	80 Ω	40 Ω
MITL Voltage	10.8 MV	7.5 MV
I_{total}	132 kA	190 kA
I_{bound}	42 kA	60 kA





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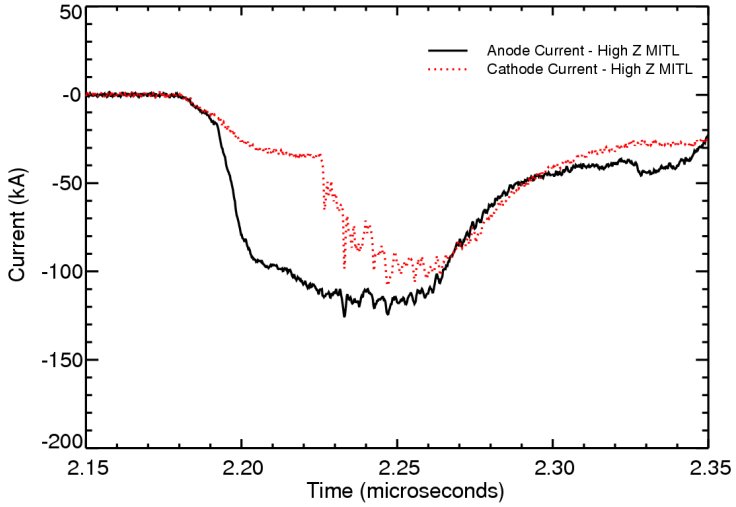
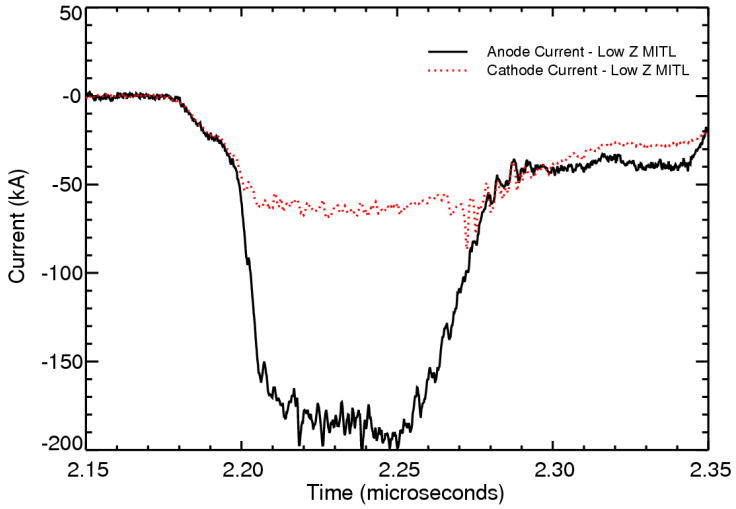
A new low impedance MITL was designed to improve coupling to low impedance diodes.

- Low Z MITL is approximately matched to PFLs and to SMP diode.
- Retrapping wave is much slower and lower amplitude than with High Z MITL.
- These plots are for LAD shots with 6cm AK gap and draw similar current as the SMP diode.

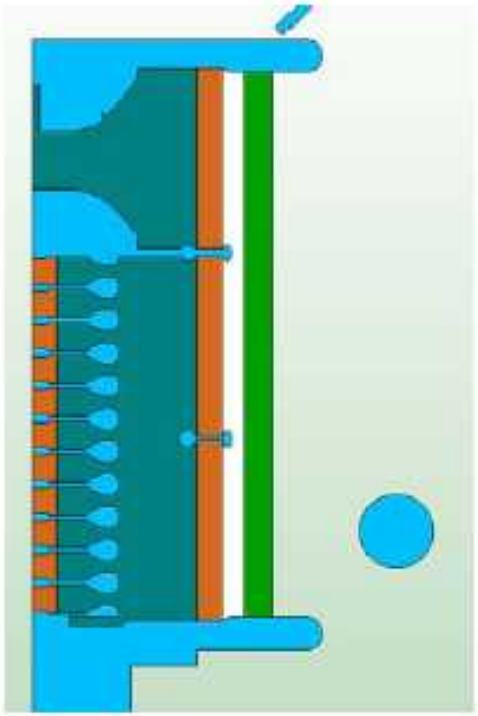




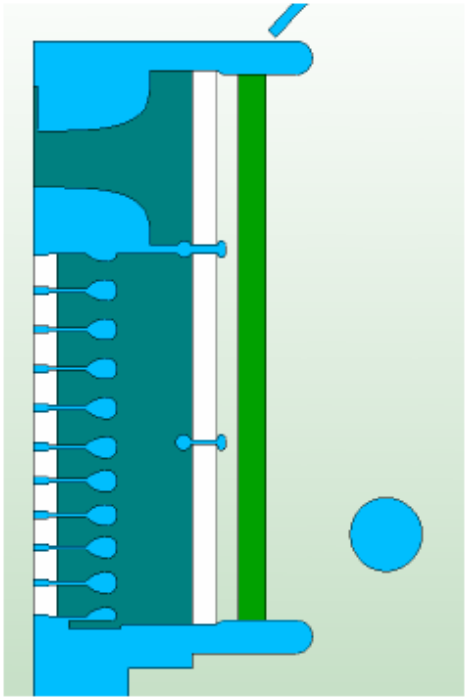
Minor modifications increase the output voltage range of the accelerator.

- The laser triggered gas switch was redesigned by Keith LeChien
- Harrison profile trigger electrodes replace two piece discontinuous shaped electrodes.
- Cascade section has 1 fewer gap
- Housing insulators are different lengths
- New switch should operate at 3.2 MV with low jitter.
- New switch will use existing
  - Cascade electrodes
  - Switch endplates
  - Housing tie rods

Old Switch

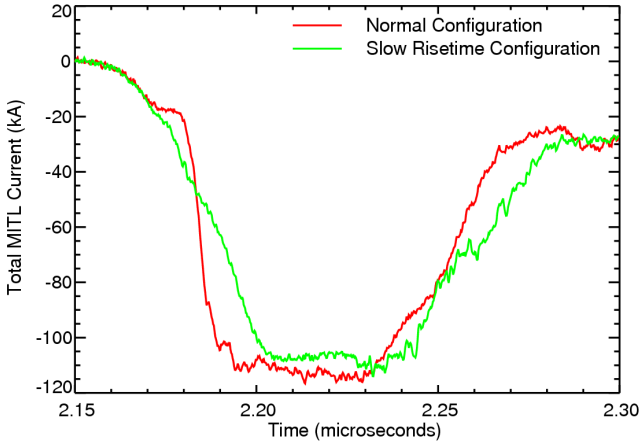


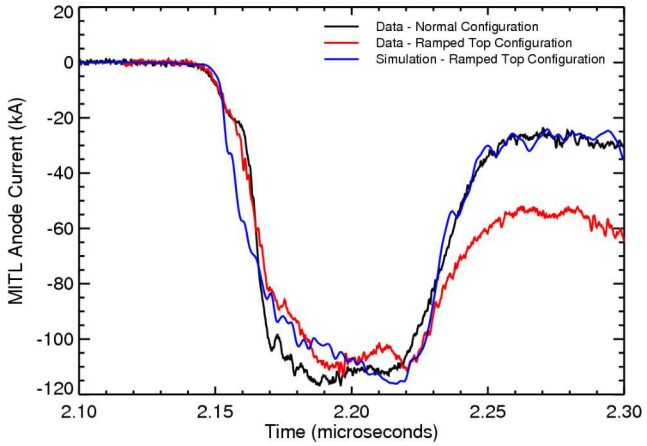
New Switch

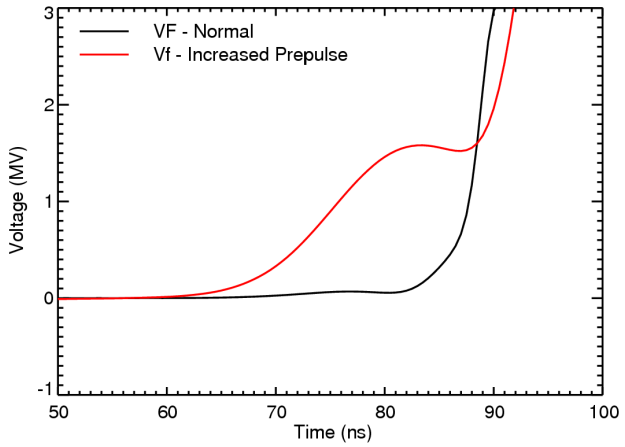


Adjustments to the PFL timing can change the output pulse shape.

- Increasing risetime – Stagger timing of pfls
- Ramped pulse top – Fire main PFL switches before PFL is fully charged
- Increase pre-pulse – Short pre-pulse switches and adjust peaking switch gap







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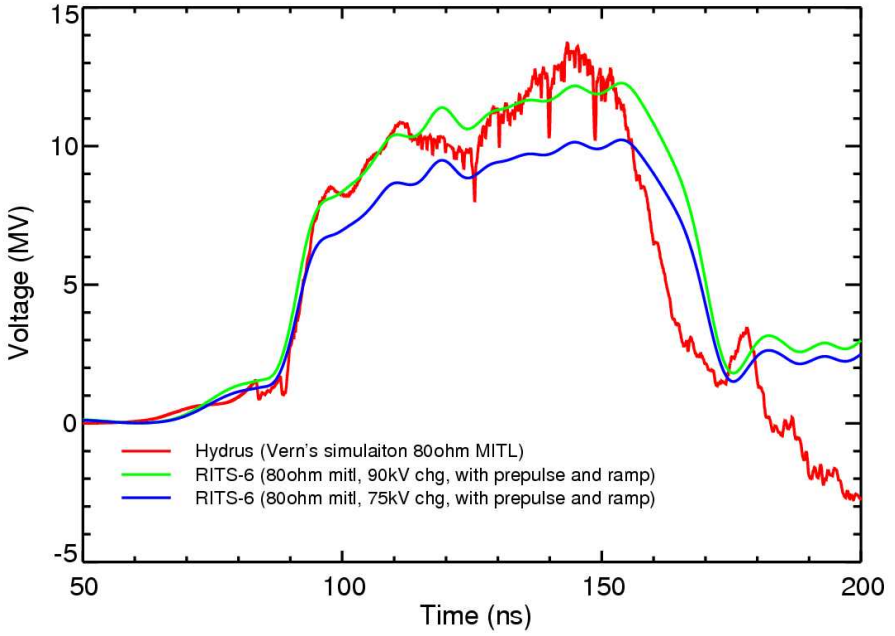
Pulse shaping techniques can be combined to mimic Hydrus pulse shape.

- Pre-pulse is increased by adjusting the peaking and pre-pulse switches
- Ramped top is generated by firing the main water switches early
- Increased output voltage would require
  - 3.25 MV on the Istore capacitors
  - 2 MV at IVA cavity insulators



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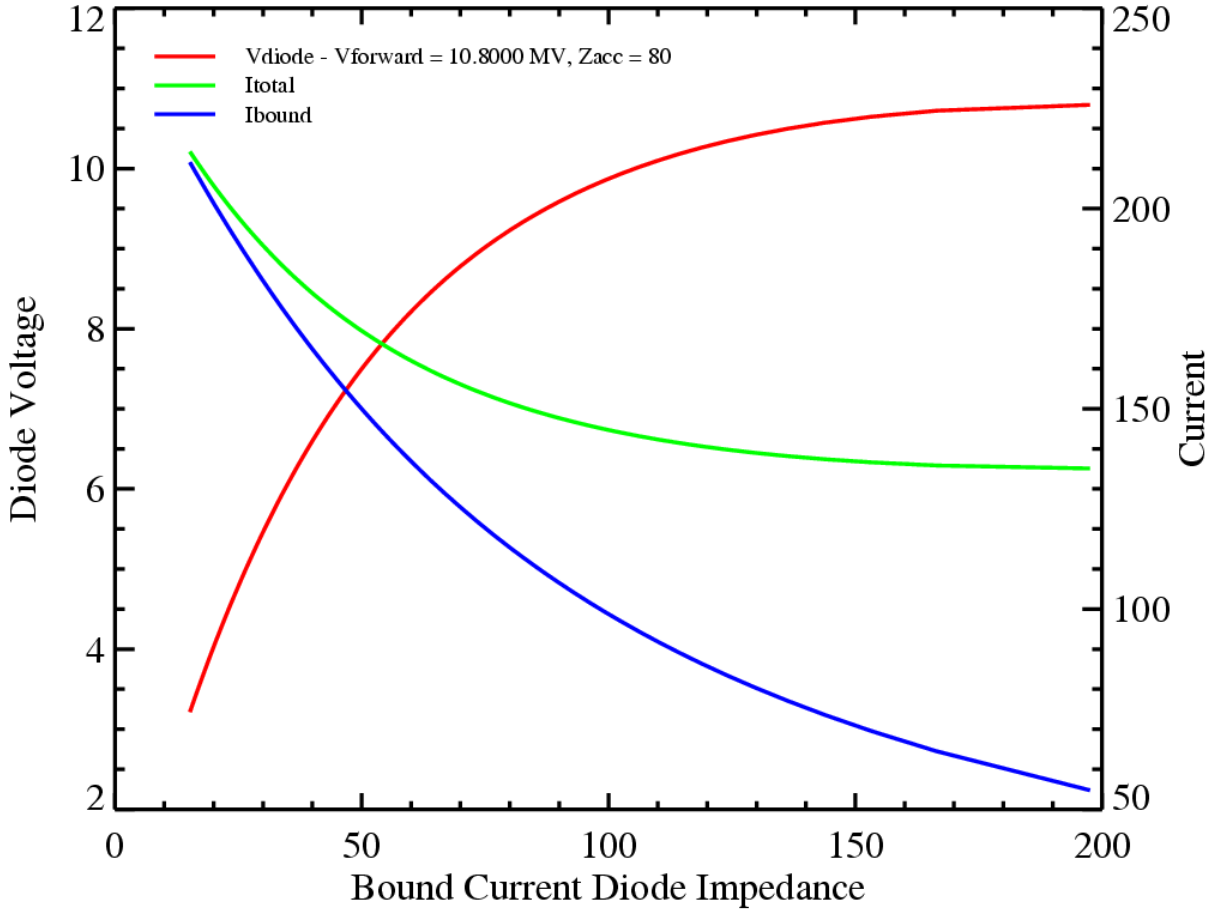
Additional Slides

High Z MITL 78kV charge



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Low Z MITL 78kV charge