

# Mapping the Damage Spots on a Ti:Sapphire Amplifier Crystal

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# Motivation

- Damage spots appear on a Ti-Sapphire crystal of a Multipass Chirped Pulse Amplifier over time.
- The Amplifier cannot function properly if the pump and pulse lasers overlap on a damage spot.
- The crystal is expensive and time-consuming to replace. It would be best to use the entire crystal before replacing it.
- A systematic approach of moving the lasers to specific areas of the crystal where there is no damage spot.

# Multipass Chirped Pulse Amplifier



# Multipass Chirped Pulse Amplifier

- Femtosecond pulse with a few nJ of energy at a rate of 85 MHz gets temporally stretched.
- 1 pulse is selected every ms to match frequency of the pump laser of the crystal.
- Through stimulated emission a gain of about 10 occurs each pass.
- After pulse is compressed, the output power of the 30 fs pulse is about 1 W, or 1 mJ.

# Measuring Scattered Light



# Imaging the Crystal





# Damage Spots





# References and Acknowledgements