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LLNL FLASH X-RAY RADIOGRAPHY MACHINE (FXR) DOUBLE-PULSE UPGRADE DIAGNOSTICS

Mike Ong
Roger Richardson
Lawrence Livermore National Laboratory
Livermore, CA 94550

When the FXR machine was first tuned in the 1980's, minimal amount of diagnostics were available and they consisted mostly of power monitors. During the recent upgrade, additional beam diagnostics were added. The upgrades included beam bugs (resistive wall beam motion sensors) and high-frequency B-dot sensors. Even with this suite of measurement tools, tuning was difficult.

For the current Double-Pulse Upgrade, beam transport is a more complex problem—the beam characteristics must be better measured. Streak and framing cameras, which measure beam size and motions, are being added. Characterization of the beam along the entire accelerator is expected and other techniques will be evaluated also.

Each sensor has limitations and only provides a piece of the puzzle. Besides providing more beam data, the set of diagnostics used should be broad enough so results can be cross validated. Results will also be compared to theoretical calculations and computer models, and successes and difficulties will be reported.

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