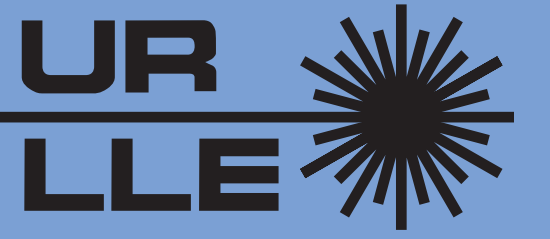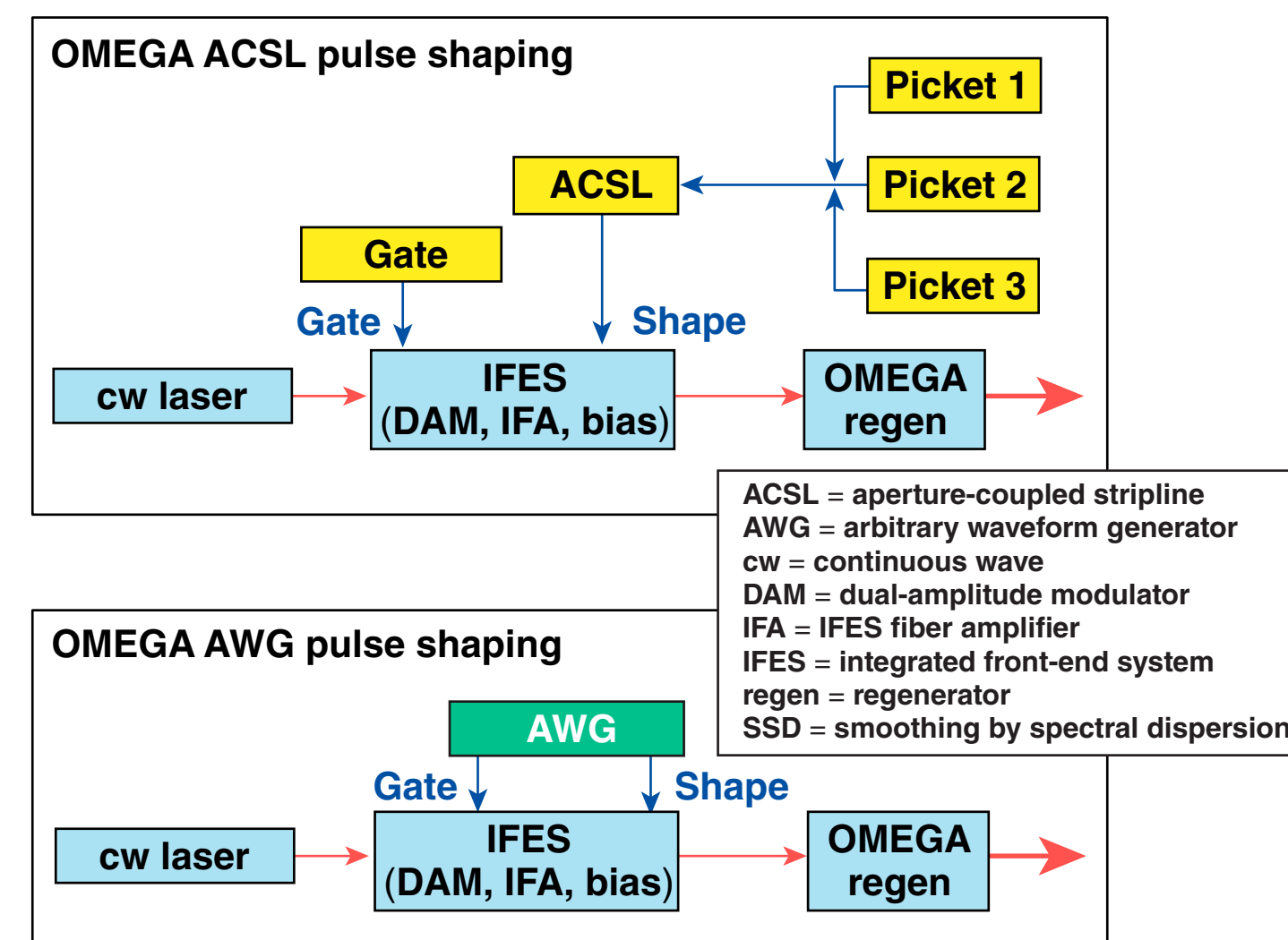# OMEGA SSD Arbitrary Waveform Generation Installation and Activation

E. M. HILL, G. BALONEK, R. CUFFNEY, J. H. KELLY, AND T. Z. KOSC

University of Rochester, Laboratory for Laser Energetics

UR LLE

An AWG was installed on the OMEGA SSD driver to replace the existing ACSL pulse-generation system

UR LLE

OMEGA ACSL pulse shaping

Picket 1
Picket 2
Picket 3
ACSL
Gate
Gate | Shape
cw laser
IFES (DAM, IFA, bias)
OMEGA regen

ACSL = aperture-coupled stripline
AWG = arbitrary waveform generator
cw = continuous wave
DAM = dual-amplitude modulator
IFA = IFES fiber amplifier
IFES = integrated front-end system
regen = regenerator
SSD = smoothing by spectral dispersion

OMEGA AWG pulse shaping

AWG
Gate | Shape
cw laser
IFES (DAM, IFA, bias)
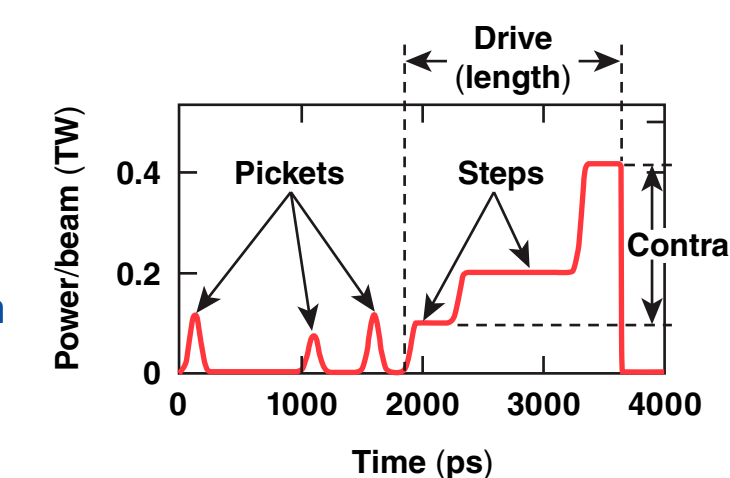OMEGA regen

G10125a

A new Omega Laser Facility pulse-shape naming convention was introduced with the activation of an AWG on the OMEGA SSD driver

UR LLE

OMEGA and OMEGA EP pulse-shape naming convention

{System}{Family}{Drive length}{Contrast*}{Pickets*}v{Version}
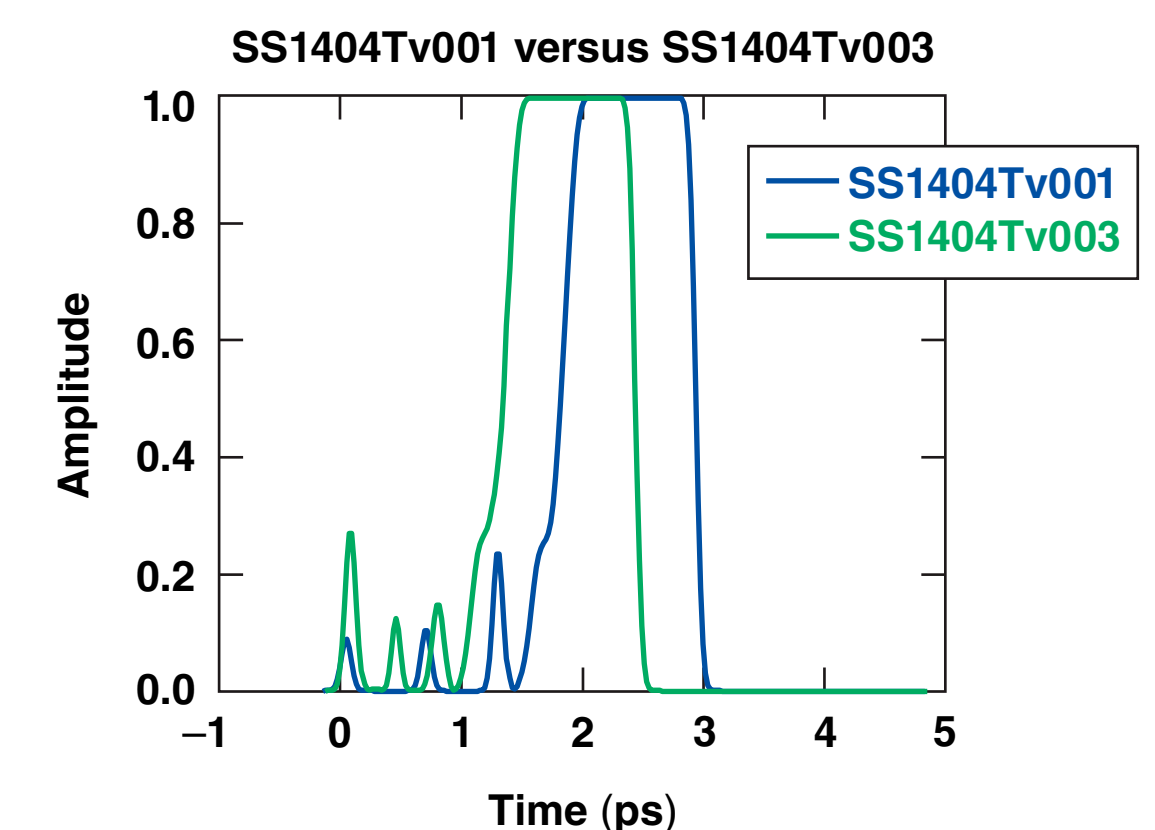Ex: SS1404Tv001

- Information about the pulse-shape naming convention can be found on the PI (Principal Investigator) Portal at **http://omegaops.lle.rochester.edu/pi_portal.htm**
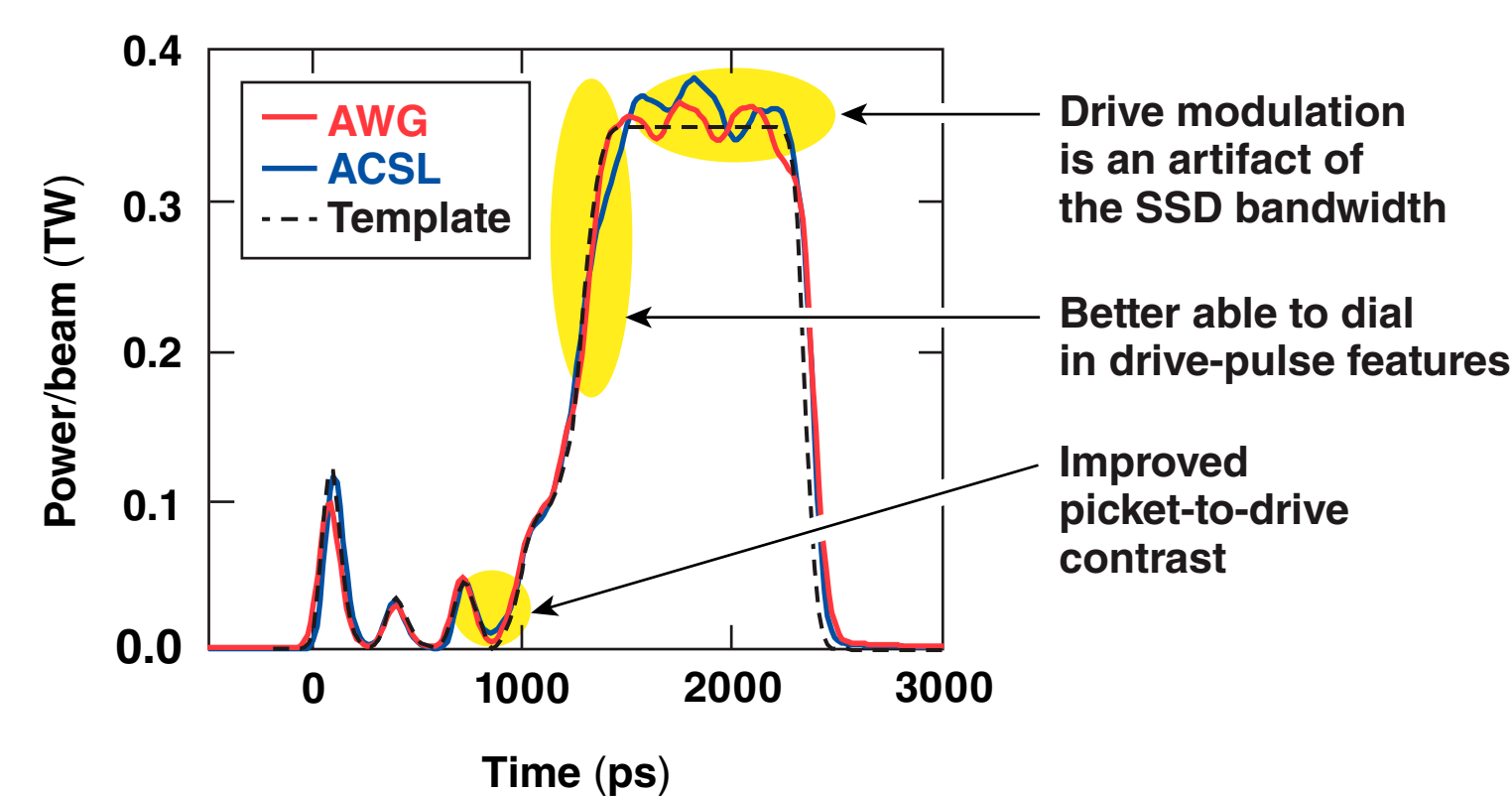

G10119b

*If applicable

The new pulse-shape naming convention eliminates the use of pulse-shape request (PSR) numbers to identify picket pulse-shape variations

UR LLE

SS1404Tv001 versus SS1404Tv003

- Using the old convention, both pulse shapes were named HE140401T; the PI would need to specify the PSR for the desired shape

G10121a

The AWG makes it possible for the facility to design and produce pulse shapes that better meet the users' requests

UR LLE

Drive modulation is an artifact of the SSD bandwidth

Better able to dial in drive-pulse features

Improved picket-to-drive contrast

G10126b

Several pulse-shape family names and picket definitions have been changed

UR LLE

New convention family names	Old convention family names
Super-Gaussian (SG)	Super-Gaussian (SG)
Step, single (SS)	Low adiabat (LA)
Step, double (SD)	High energy (HE)
Step, triple (ST)	Fast-ignition spike (FIS)
Picket, single (PS)	Picosecond pulse (PS)
Picket, double (PD)	N/A
Picket, triple (PT)	N/A
Ramp (RM)	Ramp (RM)
Reverse ramp (RR)	Reverse ramp (RR)
Modified square (MS)	Modified square (MS)

Number of pickets	SSD picket designation
1	S
2	D
3	T
4	Q

- A conversion list from the old pulse-shape names to the new pulse-shape names can be found in the pulse-shape library at **http://omegaops.lle. rochester.edu/cgi-script/ pulseShapes**

G10120a

New convention pulse-shape naming examples

UR LLE

OMEGA and OMEGA EP pulse-shape naming convention

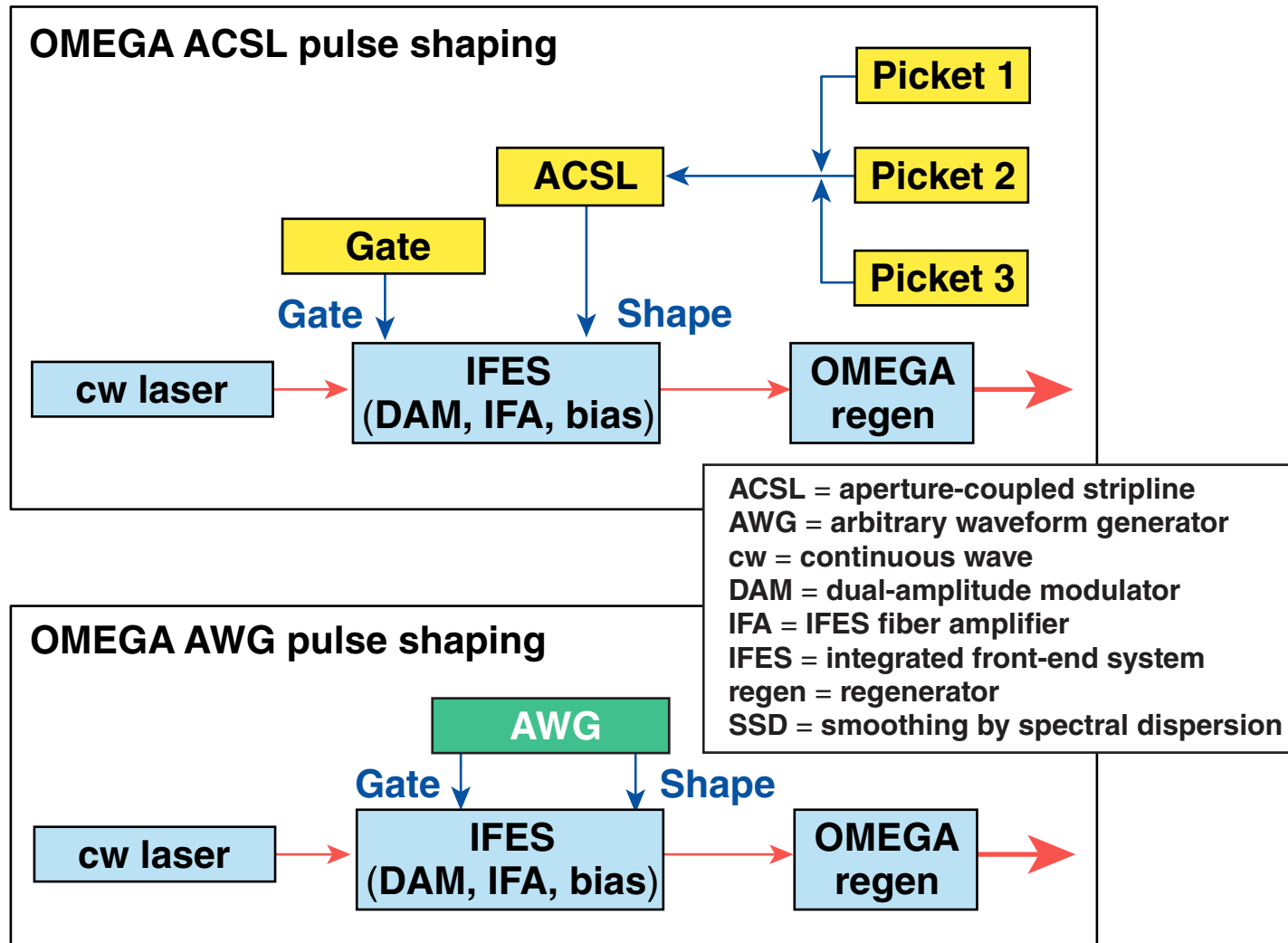{Family}{Pulse length}{Contrast*}{Pickets*}v{Version}

Example: SG10v001 (ACSL equivalent SG1018)
{Family} = SG (Super-Gaussian)
{Drive length} = 10 (1.0 ns)
{Contrast} = N/A
{Pickets} = N/A
{Version} = 1

Example: SS1404Tv001 (ACSL equivalent HE140401T)
{Family} = SS (step, single)
{Drive length} = 1.4 ns
{Contrast} = 4× (from foot to peak)
{Pickets} = 03
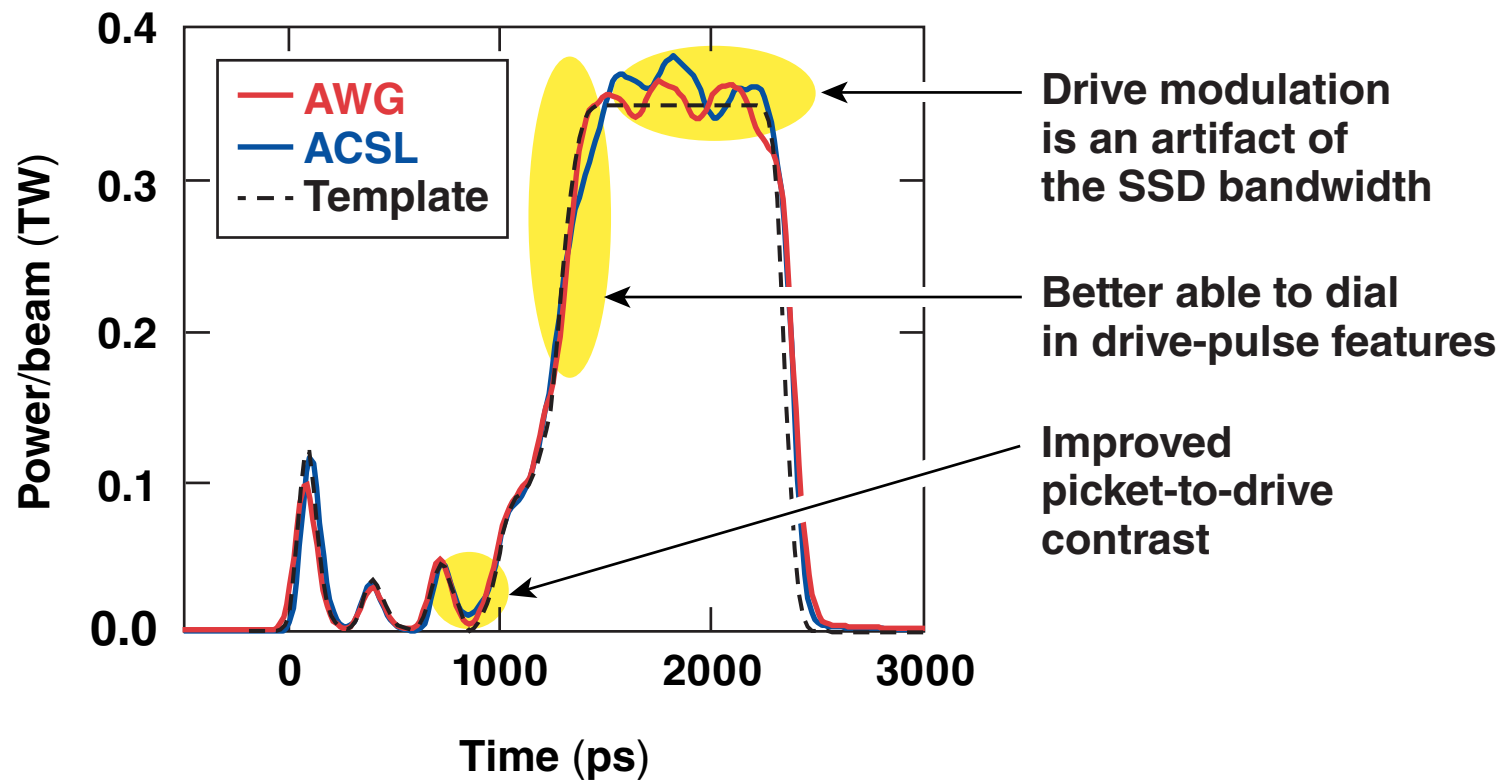{Version} = 001 (Original picket timing/energy configuration)

G10127a

*If applicable

UNIVERSITY of ROCHESTER

An AWG was installed on the OMEGA SSD driver to replace the existing ACSL pulse-generation system

OMEGA ACSL pulse shaping

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Picket 2
Picket 3
ACSL
Gate
Gate
Shape
cw laser
IFES (DAM, IFA, bias)
OMEGA regen

ACSL = aperture-coupled stripline
AWG = arbitrary waveform generator
cw = continuous wave
DAM = dual-amplitude modulator
IFA = IFES fiber amplifier
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OMEGA AWG pulse shaping

AWG
Gate
Shape
cw laser
IFES (DAM, IFA, bias)
OMEGA regen

The AWG makes it possible for the facility to design and produce pulse shapes that better meet the users' requests
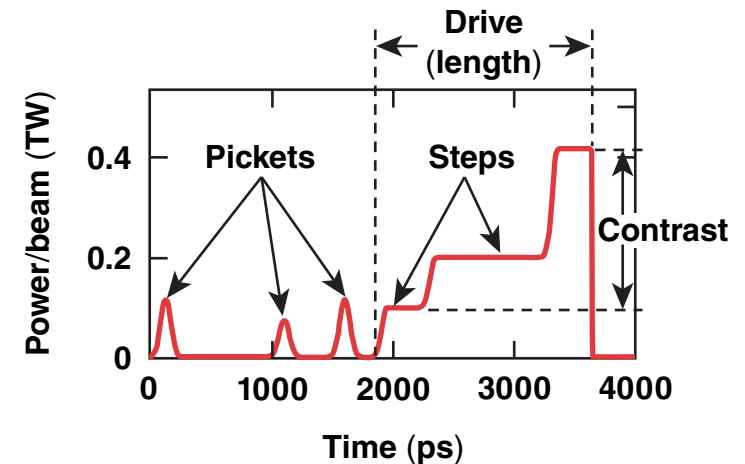
A new Omega Laser Facility pulse-shape naming convention was introduced with the activation of an AWG on the OMEGA SSD driver

OMEGA and OMEGA EP pulse-shape naming convention

{System}{Family}{Drive length}{Contrast*}{Pickets*}v{Version}
Ex: SS1404Tv001

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  http://omegaops.lle.rochester.edu/pi_portal.htm

*If applicable
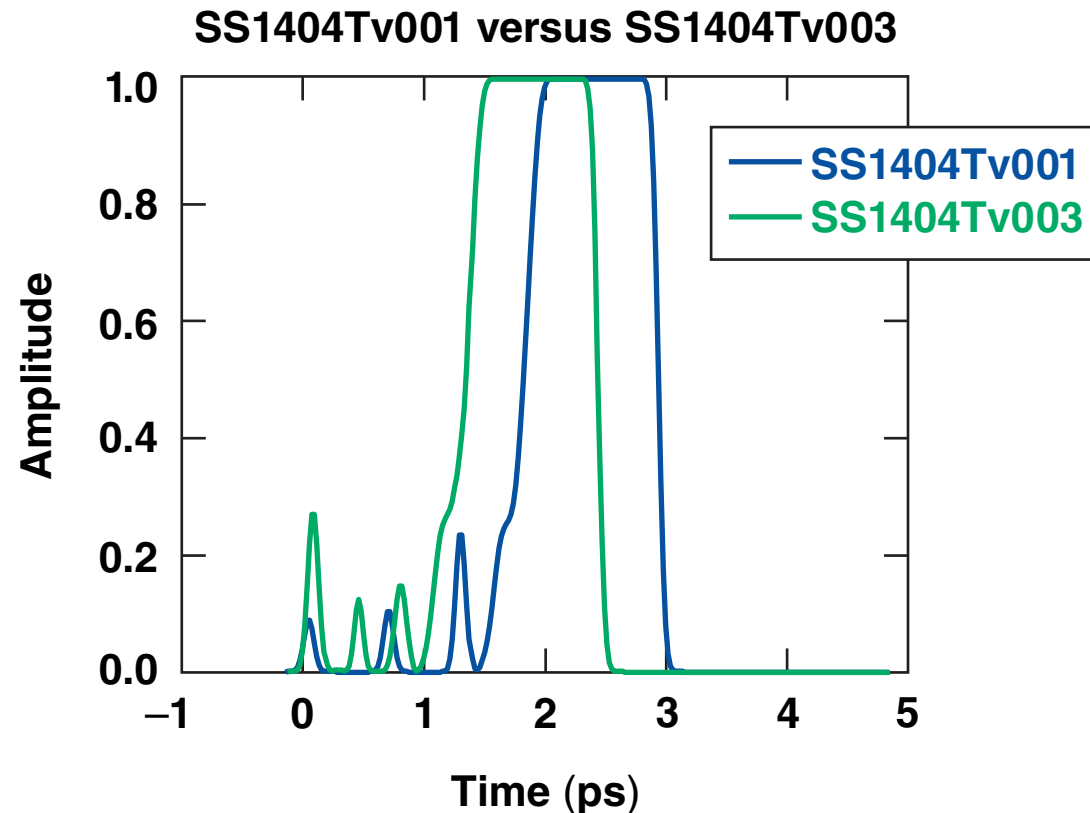
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Number of pickets	SSD picket designation
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The new pulse-shape naming convention eliminates the use of pulse-shape request (PSR) numbers to identify picket pulse-shape variations

SS1404Tv001 versus SS1404Tv003

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G10121a

New convention pulse-shape naming examples

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{Drive length} = 10 (1.0 ns)
{Contrast} = N/A
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{Family} = SS (step, single)
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*If applicable