



LASER PROCESSING POWER OUTPUT STABILIZATION

ABSTRACT OF THE DISCLOSURE

A Q-switched solid state laser system (24) operates in a pulse processing control system (10) that employs an autopulse mode and a pulse-on-position mode to stabilize the pulse-to-pulse laser energy delivered to a workpiece (20) that is moved by an X-Y positioner (18). In the autopulse mode, laser pulses are emitted at a near maximum PRF, but the pulses are blocked from reaching the workpiece by an external modulator (28, 32), such as an acousto-optic modulator ("AOM") or electro-optic modulator (also referred to as a Pockels cell). In the pulse-on-position mode, the laser emits a pulse in response to the positioner moving to a location on the workpiece that coincides with a commanded coordinate location. The processing control system delivers a stream of coordinate locations, some requiring processing, at a rate that moves the positioner and triggers the laser at about the near maximum PRF. The pulse processing control system sets the AOM to a transmissive state whenever a coordinate location requiring processing is commanded and otherwise sets the AOM to a blocking state. This pulse timing technique provides a nearly constant interpulse period for the laser, thereby improving its pulse-to-pulse energy stability at the near maximum PRF.

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