

Mid-Infra-Red Generation

The Sirah mid-infra-red generation unit (MIR) is designed to generate powerful laser pulses in the wavelength range from 4.8 to 11 μm . It is operated with a Nd:YAG pump laser, a PrecisionScan dye laser,

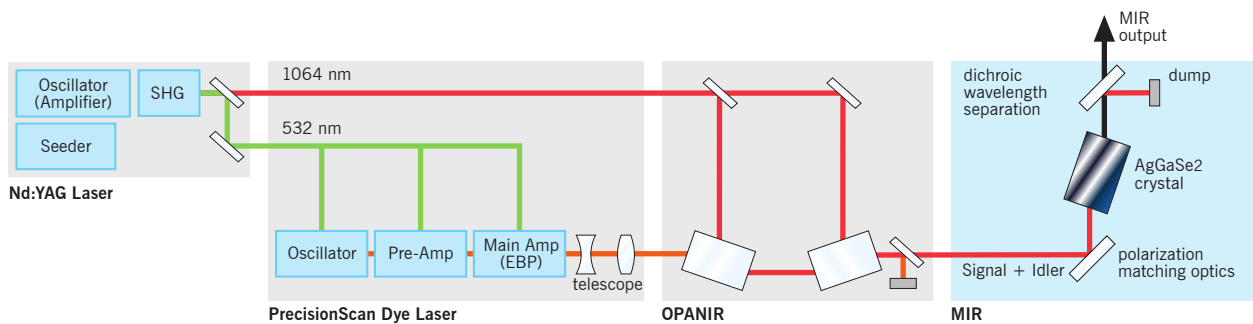
equipped with either a single or a double grating resonator with 1800 lines / mm gratings, and an optical parametrical amplifier unit (OPANIR).

Principles

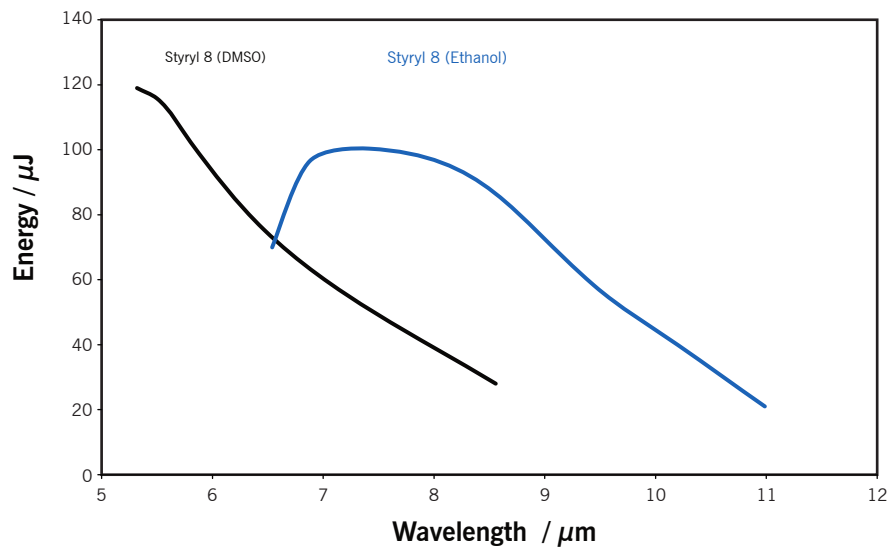
A frequency doubled, injection seeded Nd:YAG laser is used to pump a PrecisionScan dye laser, operated in the red spectral range. The dye laser output and a fraction of the residual 1064 nm pulse from the Nd:YAG laser are mixed in a LiNbO₃ crystal for difference frequency generation. The generated IR pulse passes a second LiNbO₃ crystal, pumped by the remaining 1064 nm pulse, and tuned to act as an

optical parametrical amplifier. The OPA amplifies the initial IR pulse and generates signal and idler frequency. The difference frequency of these two pulses is generated in a AgGaSe₂ crystal. Due to injection seeding, the resulting linewidth is determined by the configuration of the dye laser oscillator.

Optical Layout



Tuning Range



MIR tuning curves, when pumping with approximately 550 mJ @ 532 nm

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Energy Output

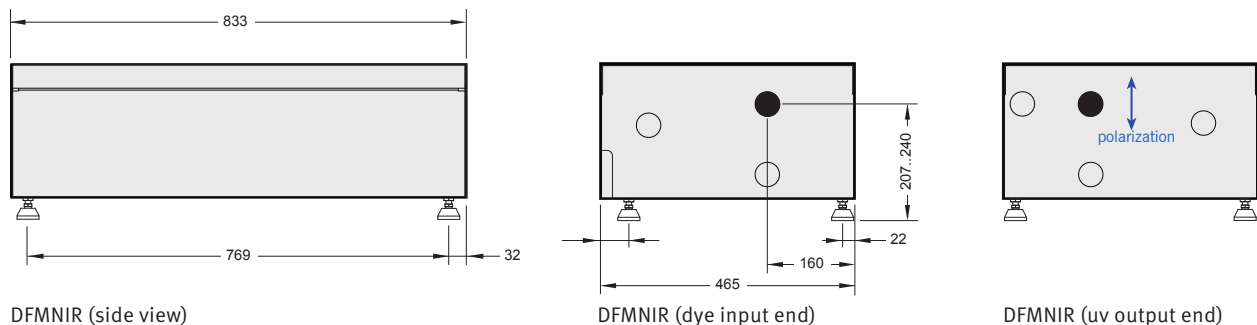
Pump Laser	Dye Laser	Output Energy
550 mJ @ 532 nm	PrecisionScan-G-18	100 μ J
550 mJ @ 532 nm	PrecisionScan-D-18	90 μ J
430 mJ @ 532 nm	PrecisionScan-G-18	70 μ J
430 mJ @ 532 nm	PrecisionScan-D-18	63 μ J

MIR energy output at 7.5 μ m (maximum Styryl 8 in Ethanol). See tuning curve for output energies at other wavelengths.

General Characteristics

Required Equipment	Injection seeded Nd:YAG laser Sirah PrecisionScan dye laser Sirah OPANIR near-infra-red unit
Maximum Pump Energy	550 mJ @ 532 nm
Dye Laser Resonator	1800 lines / mm gratings recommended 1800 lines / mm double grating resonator possible
Dye Laser Amplifier	Enhanced Beam Profile cell recommended
Repetition Rate	10 Hz recommended
Crystal Tuning Mode	Look-up table
IR Beam Polarization	Horizontal, >98%
IR Beam Diameter (typical)	5 - 9 mm, depending on amplifier cell type
IR Beam Divergence	< 0.5 mrad
IR Bandwidth	< 1.5 x dye laser bandwidth
Tuning Ranger	DFM-8M 4.8 .. 8.0 μ m (standard)

Dimensions



All Dimensions in mm
Specifications are subject to change without notice



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