Tunable optics for medical lasers

The challenge

Medical lasers serve dermatology, ophthalmology, dentistry, surgery and therapeutic care. Across these systems, optical energy must reach the target with controlled position, spot size and dwell time while the scan head remains compact.

Key limitations:

- Multi-axis galvos increase size, alignment effort and costs.
- Open-loop steering limits position verification.
- Thermal drift shifts the beam.
- Fixed optics restrict focus and spot-size control.
- Coatings constrain lifetime and useable power.

> *For example: an acne handpiece fires multiple small spots on the face; larger body-area handpieces require denser patterns and faster coverage without losing spot accuracy.*

Optotune's solution

Optotune's steering-mirror portfolio covers both wide-angle beam positioning and fine, high-speed control. The MR-15-30 combines a 15 mm aperture, ±25° mechanical tilt and closed-loop optical feedback for repeatable point-and-shoot or raster patterns. The FMR-20 adds a 20 × 20 mm aperture, 250 Hz bandwidth and high-power coating options for fast, sub-degree beam modulation. Together with Optotune tunable lenses, they enable compact 3D control of beam position, focus and spot size without translating optics

Advantages

- **Compact 2D steering** in a 30 x 14.5 mm footprint
- **Focus or spot-size tuning** without mechanical lens translation
- **Closed-loop feedback** with 40 µrad repeatability
- **Application-specific coatings** for pilot and treatment wavelengths

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Dermatology & aesthetics

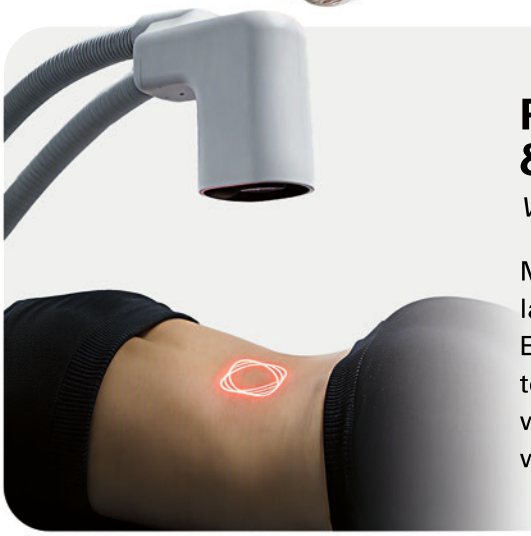
High point-and-shoot accuracy

MR mirror enable compact, precise skin-treatment lasers. With 20 Hz operation, ±50° deflection and closed-loop feedback, it steers the beam into repeatable point patterns for acne treatment, tattoo removal and skin rejuvenation.

Tissue & bone cutting

Safe high power laser handling

MR mirrors support compact bone and tissue ablation systems. It handles 50 W average power, settles in <2.5ms for 0.1° steps and combines a dual-wavelength coating for VIS pilot and 2–3 µm treatment beams with mirror flatness better than λ/5 for programmable point matrices.



Photobiomodulation & wound care

VIS and NIR compatible

MR mirrors scan low-intensity 660–980 nm laser beams in programmable patterns, while EL lenses adjust spot size and working distance to maintain consistent irradiance across uneven wounds—enabling compact, flexible multi-wavelength PBM systems.

Customer success story

Optotune's MR-15-30 enabled precise laser beam steering in acne-treatment handpieces. Following the successful facial application, the partnership supported a larger body-treatment concept with 25 positions, flexible mirror coatings and practical thermal-integration guidance.

Improved precision
due to 400 µm spot placement

Increased covered area
with 25-point body pattern

Reduced exposure time
with full pattern in <1 s

Scan for more info:

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