LUTRONIC

SPECTRA

DUAL MODE Q-SWITCHED ND:YAG LASER
• Laser Medium: Nd:YAG
• Wavelengths: 1064 nm / 532 nm (Option: 585 nm, 650 nm)
• Operation Modes: Q-switched (5 ns) & Spectra Mode (300 μs)
• Beam Profile: Top Hat Mode
• Pulse Energy: Max 1.2 J
• Pulse Widths: 5 - 10 ns (Q-switched Mode) / 300 μs (Spectra Mode)
• Spot Size: Max. 8 mm
• Pulse Rate: Max. 10 Hz
• Energy Calibration: External, Auto-Calibration & Self-Restoration
SPECTRA SYSTEM OVERVIEW

- Dual Mode (5-10 ns OR 300 µs)
- 4 wavelengths 1064, 532, 585, 650 nm
- Auto-Calibration & Self Restoration
- Auto-Detected Handpiece Spot Size
- 3-8 Zoom Collimated Handpiece (Max 8 mm Spot Size)
- Laser Toning Button and User Programmable Memory Button
- Arm Position in front
- Adjustable Aiming Beam
- User Friendly GUI Interface
- LCD Touch Screen
- Chromium Articulated Arm
- Easy Operation Environment
- Compact and Ergonomic Design, Arm mounted in front
SPECTRA HANDPIECES

3-8mm Zoom Collimated [Standard]
1-7mm Zoom [Optional]
Dye Handpiece (585nm) [Optional]
    For Sky Blue Tattoo
Dye Handpiece (650nm) [Optional]
    For Green Tattoo
Gold Handpiece (585nm) [Optional]
    For redness

-New-
Refillable dye pack
AUTO-RECOGNITION

- Changing the Handpiece spot size automatically changes the GUI spot size.
- Ensures the GUI fluence matches the output delivered, preventing adverse events due to unexpected excessive fluence.
HIGH PEAK POWER AND SHORTER PULSE WIDTH

Less Lateral Thermal Damage
- MINIMIZES inflammation preventing side effects:
  - PIH
  - Recurrence during melasma treatments

More Effective Pigment Clearance
- Fewer treatments to remove pigment or ink

Other Q-S Products
unable to deliver the same benefits because of their longer pulse widths resulting from unstable output
BEAM PROFILE ANALYSIS
1064 NM, 8 MM, 1.2 J/CM²

Even distribution of energy shows that there is no excessive or irregular distribution of energy. Operators can expect reproducible clinical outcomes without side-effects.

Product A

Due to the irregular distribution of power in the beam profile, the resultant ‘hot spots’ could result in over-treatment related side effects.

Source: Lutronic R&D
SPECTRA INDICATIONS

- Tattoo (inc. colored)
- Melasma
- PIH
- Skin Rejuvenation
- Active Acne*
- Post Acne Erythema
- Nevus of Ota
- Lentigo
- Freckles
- Seborrheic Keratosis
- Large Pores**
- Others

*Note: No FDA clearance for active acne / inflammatory acne
**Note: No FDA clearance for large pores
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-NEW-
Gold Handpiece for the Treatment of Redness & Post Acne Erythema
The Spectra Gold HP provides superior clearance of inflammatory redness due to acne and facial flushing. The only Q-Switched 585 nm laser at a 5mm spot size, the 585 nm laser used at low fluence is ideal to gently reduce unwanted erythema.

The Gold HP works by utilizing the high absorption of the 585 nm in deoxy- and oxy-hemoglobin at very short pulses and low fluence to photobiomodulate the microvasculature in an abnormal status without causing purpura. Over a series of 3-10 treatments, use of the Gold HP will reduce the redness associated with a range of conditions.

Replaceable dye-pack
ABSORPTION SPECTRUM OF NEW GOLD HANDPIECE

585 nm Wavelength

High absorption rate in hemoglobin

High absorption rate in melanin (But lower than 532 nm)
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Tattoo Removal
THE PHYSICS OF LASER TATTOO REMOVAL

• Each pulse of energy penetrates the skin and is absorbed by the tattoo ink.
• As the tattoo ink particles absorb the energy, they heat up and then shatter into tiny fragments.
• Then, over the weeks following treatment, the body’s immune system flushes the tattoo ink particles away from the location, lightening the appearance of the tattoo.
• Each laser treatment breaks down more and more of the tattoo ink until none remains.

Selective Photothermolysis

From 3 Greek root words
• "photo" = light
• "thermo" = heat
• "lysis" = destruction

Precise targeting of a structure or tissue using a specific wavelength of light with the intention of absorbing light into that target area alone.

The energy directed into the target area produces sufficient heat to damage the target while allowing the surrounding area to remain relatively untouched.
MECHANISM OF ACTION FOR TATTOO REMOVAL

• Q-switching is a special type of laser pulse creation. Q-switched lasers produce intensely powerful, brief pulses of energy – for Spectra lasting just 5 nanoseconds ($10^{-9}$).
• Tattoo ink particles are extremely small (typically nanometers in diameter), and so they need to be heated for a very brief period of time to warm up and explode.
• The longer the pulse the more time for heat to conduct to surrounding tissue. By using very short nanosecond pulses heat is confined to pigment particles leaving the surrounding tissue intact.

Q-Switched Nd:YAG Laser

Pigment or ink particles  →  Explosion  →  Absorption and drainage by human immune system

Source: Lutronic illustration
SPEED OF TREATMENT
3-8 MM ZOOM COLLIMATED HANDPIECE

• Large 8 mm spot size enables rapid treatments of tattoo inks
  o 3-8 mm adjustable on-the-fly spot size change
  o Set the spot size to the tattoo size
• Easier on operator
  o Collimated output eliminates need to maintain specific distance from tissue
  o Auto-recognition handpiece provides consistent fluences
TARGETING TATTOO INK

- Tattoos come in every color and different colors absorb and reflect different wavelengths. An apparent color, however, can be a mixture of different pigments.
- To breakup the tattoo ink particles the wavelength used must be well-absorbed.
- When treating multicolored tattoos, access to a variety of laser wavelengths is important.
- The most common wavelengths used for laser tattoo removal are 1064 nm and 532 nm – they can treat 95%+ of tattoos.
- The optional 585 nm and 650 nm dye handpieces are useful for treating sky blue or green inks.

Spectra’s wavelengths cover broadest spectrum of tattoo colors
LETTING THE BODY DO ITS WORK

• Tattoo removal is not an instant fix – it’s usually a several month commitment. Most tattoos require between 5 and 10 treatments spaced at least 6 weeks apart.

• The tattoo ink is injected at different depths within the dermis. The shallowest layers of ink absorb the energy and shatter. Once the body flushes away the top layers of ink the deeper layers be treated.

• In effect, every successive tattoo removal treatment affects deeper and deeper layers of ink until none remain.

• It takes time for the body to flush away the shattered tattoo ink from within the skin. Phagocytic cells gradually moving the ink particles to the lymph nodes, where the pigments remain. Because the body can only flush away the ink at a certain speed, it’s beneficial to wait as long as possible between treatments to see maximum fading from each session. Also, the waiting period allows any scabs or blisters to heal, minimizing the possibility of over-treating the area and causing unwanted side effects.
Pigmentation & Melasma Treatments
REMOVAL OF UNWANTED PIGMENT

• Basic mechanisms
  – Theory of selective photothermolysis
  – Damage melanosome or melanocyte?
• What and where is the pigment?
PHYSICS PRINCIPLES

• SELECTIVE ABSORPTION
  - Melanin the target chromophore has a broad spectrum of absorption

• WAVELENGTH PENETRATION
  - Shorter wavelengths have higher absorption and greater scatter so they don’t penetrate as deep as longer wavelengths

• TISSUE SCATTER
  - Larger spot size has deeper effect
REMOVAL OF BENIGN PIGMENTED LESIONS

• The nanopulse Nd: YAG laser is the gold standard in treating moderate and deep pigment disorders and more recently melasma.
  – <750 ns pulses disrupt melanosomes through a photoacoustic disruption - longer pulse durations (eg, 400 microseconds) do not
  – This is consistent with the theory of selective photothermolysis, which states that the pulse duration of an emitted laser wavelength must be less than the thermal relaxation time of the targeted object.
  – A typical 1-μm melanosome has a thermal relaxation time of 0.5-1 μs.

• Long-pulse, broad-band approaches such as IPL can be effective
  – Create sufficient bulk heating to cause sloughing of epidermis which removes the pigment containing keratinocytes
  – For PIH and melasma bulk heating approaches are not recommended because bulk heating and inflammation can further stimulate melanocytes
1st pass
1.6 – 1.8 J/cm²
With carbon lotion

2nd pass to mild erythema
1.0 J/cm²
without carbon lotion

1.0 J/cm² to mild erythema
A 1st pass with carbon lotion is optional
1.6 – 1.8 J/cm²

1-2 week interval

Repeat for 7 – 12 treatments

*Q-Switch 1064nm 5 ns fixed pulse width setting
WHAT IS IMPORTANT WHEN TREATING MELASMA

Other 1064 nm Q-S Lasers
- Lower Peak Power
- Longer PW

SPECTRA
- High Power
- Short PW
- QSw 1064 nm

Max. Peak Energy: 240 Mega Watt
Peak Energy: 100 Mega Watt

Power

Less melanin breakdown
 Thermal damage can stimulate melanocytes
 High recurrence of melasma

Melanin breakdown
 No Thermal damage to stimulate melanocytes
 No recurrence after treatment

* Lutronic Illustration
Two melanocytes are seen in 3D, reconstructed from the data from 500 x 50 nm slices and computer rendered: color is for illustrative purposes only. Image is of skin from a melasma patient before skin toning.

A melanocyte from the same patient after laser toning. The cell is still alive, but appears to have undergone a ‘dendrectomy’

Journal of Electron Microscopy, 2011; 60: 11–18
**DUAL PULSE MODES**
**COMBINATION THERAPY ENABLED**

**Q-Switched Mode**
5-10 nsec – short pulse
Shorter pulse width → High peak power
- Break down & remove chromophore
  - Tattoo Removal
  - Melasma
  - Laser Peel

**SPECTRA Mode**
300 μsec – quasi-long pulse
Longer pulse width → Thermal effect
- Skin Rejuvenation

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Source: Lutronic Illustration
COMBINATION THERAPY: SPECTRA PEEL

1. PATENTED CARBON LOTION APPLICATION

   Photo Enhancing Effect
   Carbon Lotion seeps into pores

2. SPECTRA MODE
   - 1064 nm
   - 300 μs
   Thermal Effect
   Carbon Lotion is gently heated

3. QSw MODE
   - 1064 nm
   - 5 ns
   Peeling Effect
   Carbon Particles explodes

*Lutronic has a Method Patent to target pigmented lotions*
PATENTED SPECTRA PEEL TREATMENT
IMMEDIATE AND LONG TERM EFFECTS

Changes within 1st and 2nd Tx
- Dyschromia is Improved
- Clearer, Younger Looking Skin
- Exfoliates the Stratum Corneum
- Stimulates Collagen Regeneration
- Reduces Sebum Production

Changes after the 3rd Treatment
- Softens Skin Tone
- Improves Skin Texture
- Continues to Regenerate Collagen
- Reduces Inflamed Acne and Improves Acne Scars
- Reduces Pore Size
- Improves Fine Lines and Wrinkles

Source: Dr. Melanie Palm, MD, MBA
KEY POINTS

SPECTRA: Key Points

• Spectra Mode: for active acne* and better skin rejuvenation

• Melasma: Only laser with FDA Clearance

• Unique Patented Procedure: Spectra Peel™

• Peer reviewed papers for Laser Toning with SPECTRA™

• Beam quality stability at 1064 & 532 nm, especially at lower fluence at 532 nm: minimize or less PIH!!

• Professional clinical support: Physician’s Clinical Guide

* No FDA clearance for active acne / inflammatory acne