

2 μm lasers for minimally-invasive surgery

René Dornieden

R&D Engineer, LISA Laser Products GmbH, Germany



April 28th, 2022, the EPIC Meeting on Laser, Optics and Sensors for Medical Devices at Laser World of Photonics, Munich, Germany

- History and core achievements
- Properties of 2 μm lasers
- Voice of customers
- Next generation's surgical laser
- Case videos: bladder stones, kidney stones, and BPH
- Clinical feedback

Historical background and achievements

- Competence in medical lasers since 1989
- Holmium lasers: Sphinx product family
- Thulium lasers: RevoLix product family
- Number of lasers in field ~ 2000
- Number of peer-reviewed publications > 1000



COMPETENCE IN MEDICAL LASERS SINCE 1989
LASER TECHNOLOGY - MADE IN GERMANY



- | Medical Laser | Industrial Products |
|---------------------|-----------------------|
| RevoLix | Diode laser modules |
| RevoLix DUO | DioPow |
| RevoLix jr. | Laserpointer |
| Sphinx | Charging Power Supply |
| Sphinx jr. | |
| DioLix | |
| Medical Accessories | |
| Billing Systems | |

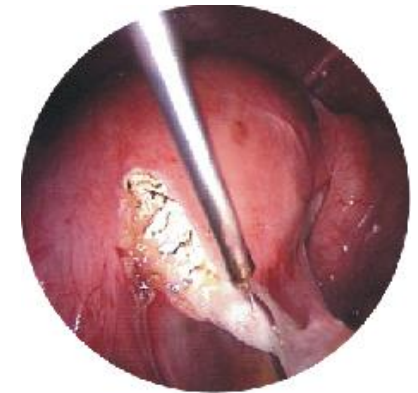
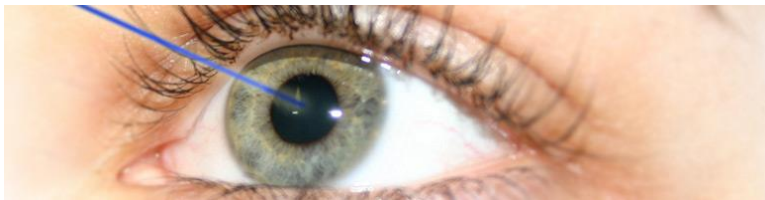
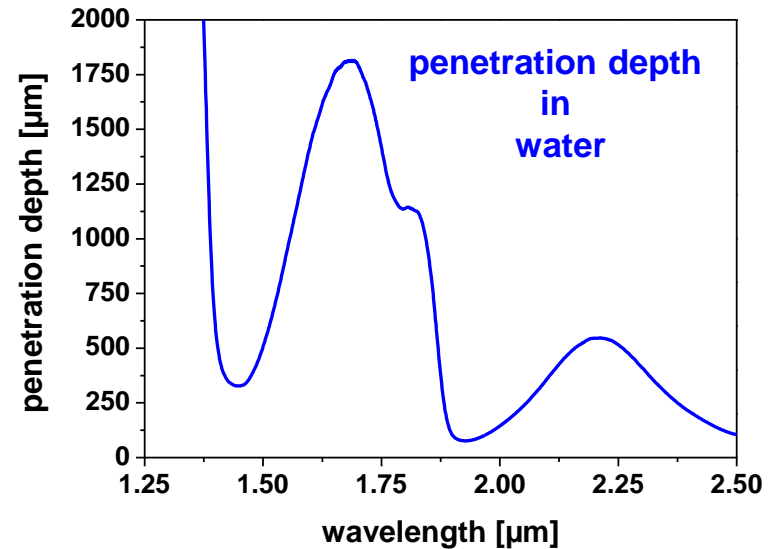


COMPETENCE IN MEDICAL LASERS SINCE 1989
LASER TECHNOLOGY - MADE IN GERMANY

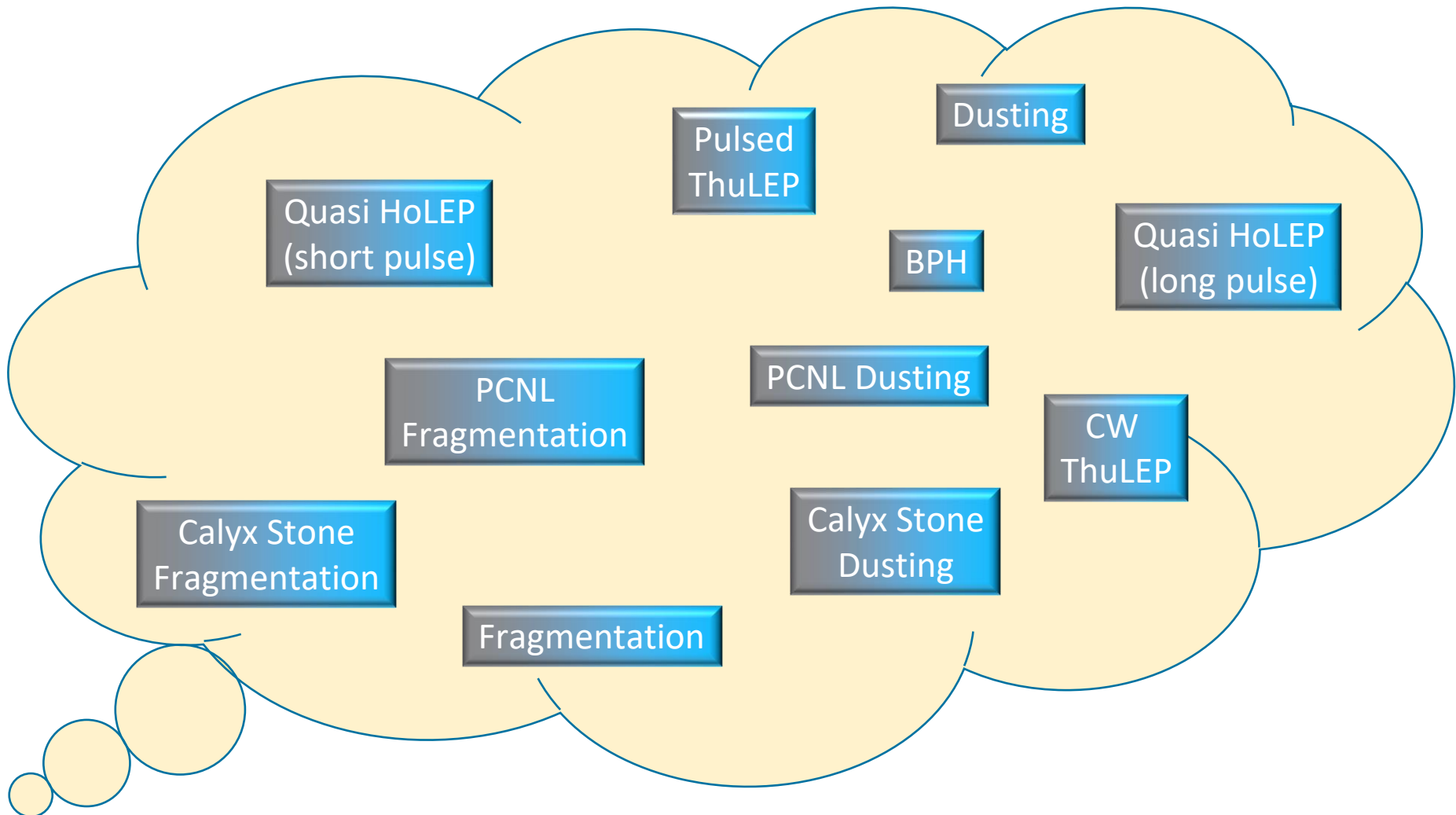
Properties of 2 μm lasers

Properties of 2 μm lasers

- Efficient Silica fiber guiding
 - minimally-invasive procedure
 - patient friendly
- High absorption in water
 - penetration depth $\sim 150 \mu\text{m}$
 - using the laser as a scalpel
 - excellent hemostasis at 2,013 nm
 - nominally eye-safe



Doctor's Wishlist



Our Approach

- Diode Pumped Solid State Laser (DPSSL)
- Advanced Tm:YAG crystal laser technology
- Evidence based for many surgical applications at 2,013 nm wavelength
- Provides high-power and high peak power performance
- One laser for both operation modes
 - Compact design
 - Versatile use: soft tissue & urinary stones

CW mode

Vaporization (ThuVAP)
Vaporessection (ThuVaRP)
Vapoenucleation (ThuVEP)
Anatomical enucleation (ThuLEP)
coagulation

+

Pulsed mode

Dusting
Fragmentation
Enucleation
PCNL Fragmentation
PCNL Dusting
Pulsed ThuLEP
Quasi HoLEP

=

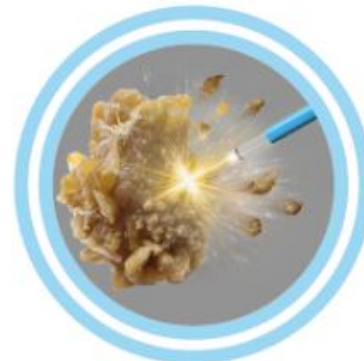
Hybrid mode

Benefits for surgical applications



Tissue

- No deep penetration and no uncontrolled necrosis
- Controlled tissue effect
- Excellent hemostasis thanks to the Thulium wavelength of 2,013 nm
- Recommended for high-risk BPH patients on anticoagulants
- Low laser damage zone of ≈ 1 mm
- Based on evidence



Stone

- Less retropulsion: reduced compared to Holmium lasers
- Increased control and safety due to optimum wavelength of 2,013 nm
- Broad application modes: both dusting and fragmentation, etc.
- Crystal clear view during the intervention

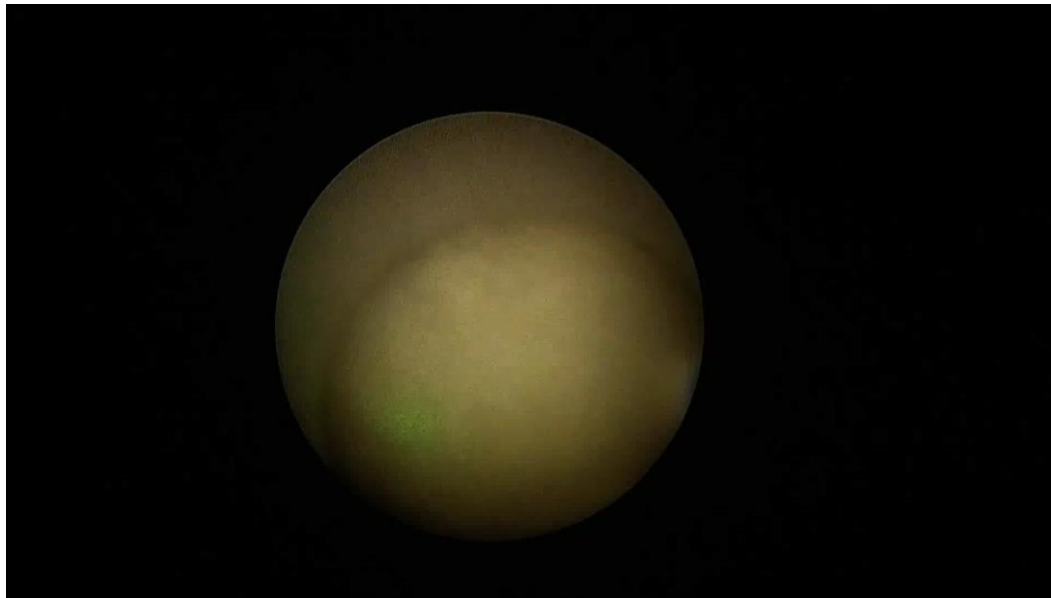
Clinical Performance: soft tissue (Prostate)

- Performed by Prof. Dr. Herrmann, Spital Thurgau AG, Switzerland
- ThuVEP, ThuLEP
- 70 W, 40 Hz, 1.8 J



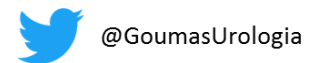
Clinical Performance: urinary stones (Kidney)

- Performed by Dr. Netsch, Asklepios Clinic Hamburg, Germany
- PCNL Dusting
- 40 W, 115 Hz, 0.4 J



Clinical Performance: urinary stones (Bladder)

- Performed by Dr. Goumas, Istituto Clinico Beato Matteo, Italy
- Fragmentation, dusting, and popcorning of urinary stones
- 2 bladder stones
- 1,300 W peak power
- **25 min!!!**



Clinical feedback

HEALTH WARE Healthware Private Limited
1,085 Follower
1 Tag

RevoLix HTL: The Revolution in Thulium Lasers.
The experts at AINU got their hands-on experience on the new RevoLix HTL for first time in India. Excited by the excellent results and positive response from the experts.
[#RevoLixHTL](#) [#hybrid](#) [#urology](#) [#healthware](#) [#lisalaser](#)

Übersetzung anzeigen



Clinical feedback

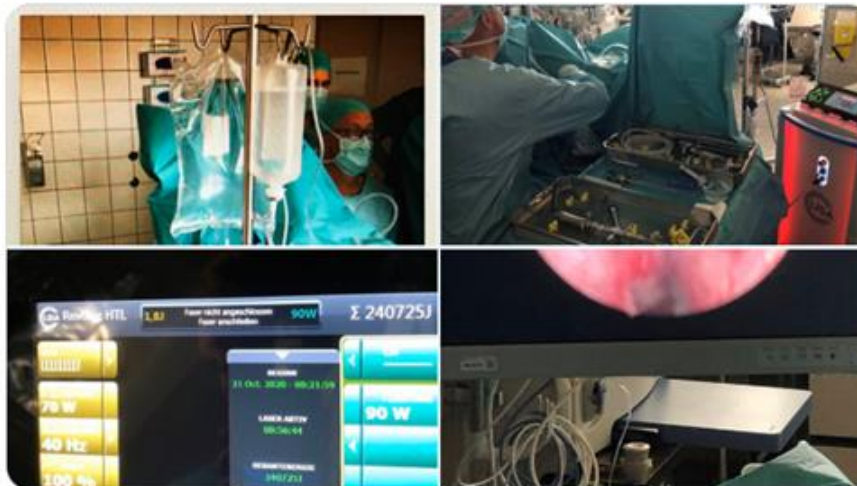


Thomas RW Herrmann
@trwherrmann



#Thuliumreloaded #TmYAG #Revolix #HTL #Premiere @SRUrology I had the privilege to introduce the #novel #Thulium Laser for #stones and #tissue @lisalaseruro in #Kantonspital #Frauenfeld in #Kanton @ThurgauBodensee today doing 3 #EEP #ThuLEP, look-a-Like „#HoLEP“ and a #TmfLEP





[Tweet übersetzen](#)



Thomas RW Herrmann und 3 weitere Personen

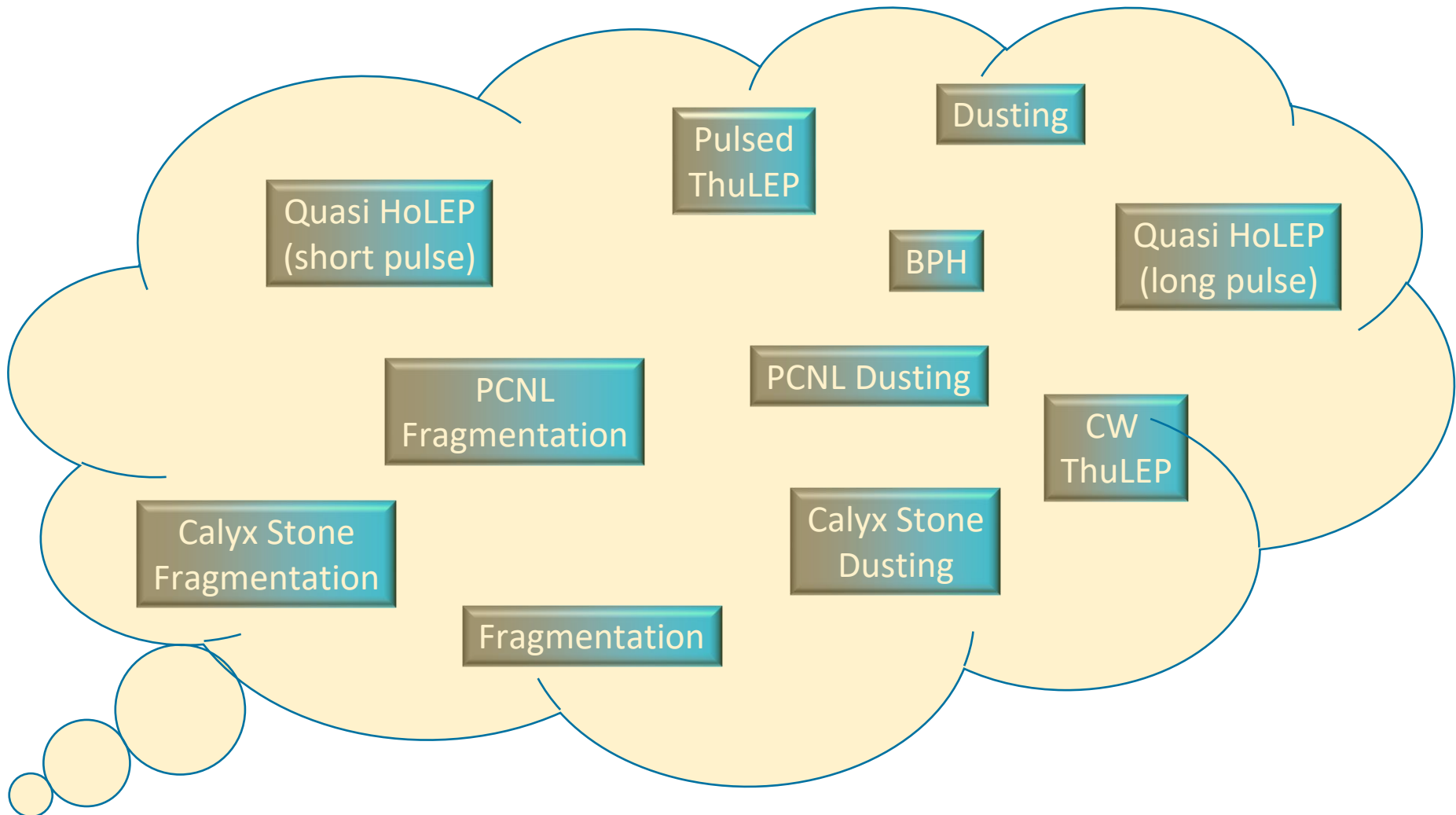
4:34 nachm. · 21. Okt. 2020 · Twitter for iPhone

Clinical feedback

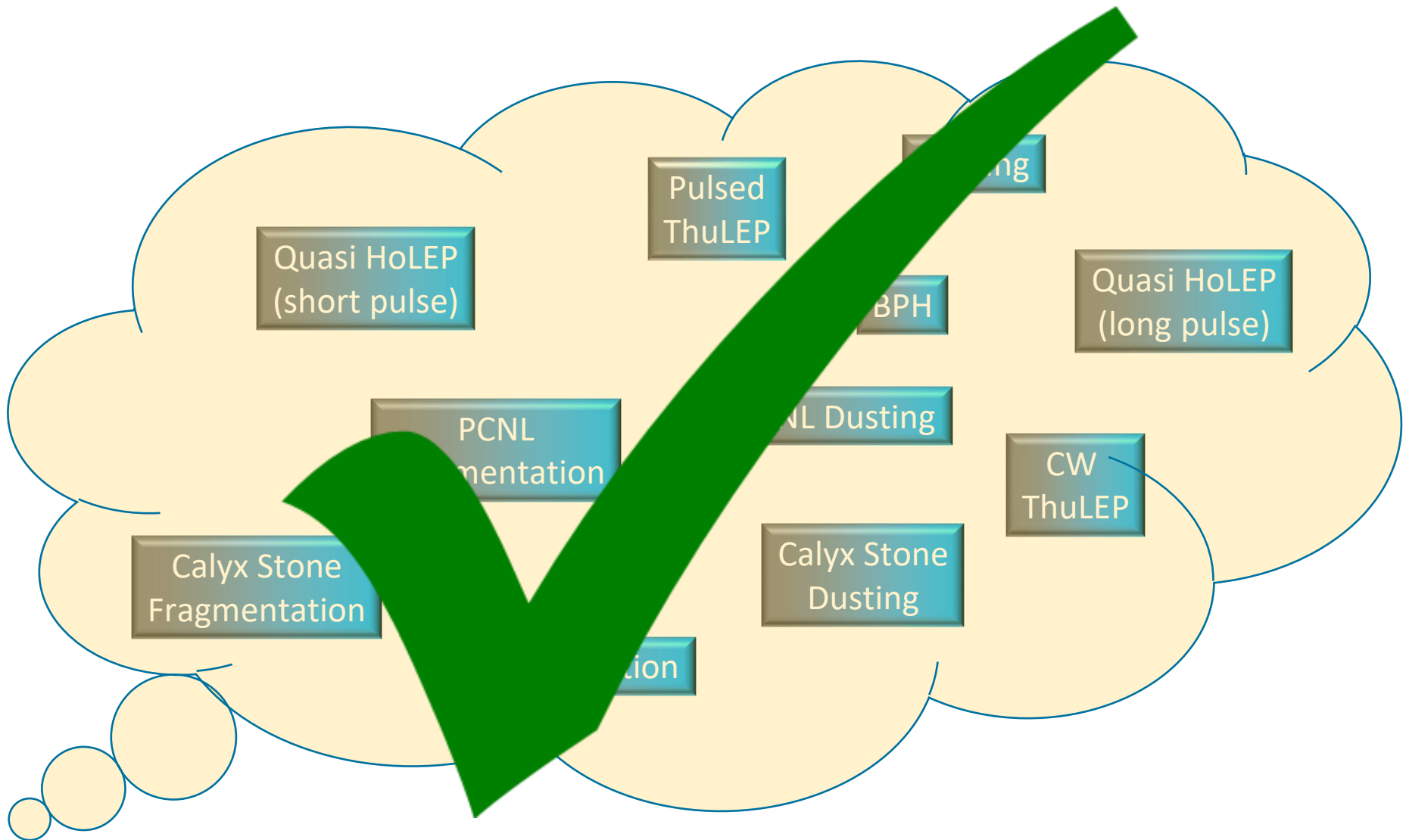
-  **Goumas Urologia** @GoumasUrologia · 1. Nov. ⋮
Not a video game, it is reality.
Bladder lithotripsy (case 2) w/ #thulium #Revolix THL → high pulse peak power by @lisalaseruro
100 W (1J 100Hz) 550 μ multiuse fiber
[@DimedOnline](#) [@samir_lamrini](#)
- Full case in a while via You Tube
-  **Samir Lamrini** @samir_lamrini · 1. Nov. ⋮
Indeed, the pulse peak power of the new #RevolixHTL exceeds 1,000W!!!
💬 ↻ ❤️ 1 📤 📊
-  **Antonio Servera** @uroServera · 1. Nov. ⋮
Antwort an @GoumasUrologia @lisalaseruro und 2 weitere Personen
1-100!!!
Looks like an Endoscopic Superpower!!!
💬 1 ↻ ❤️ 3 📤
-  **Goumas Urologia** @GoumasUrologia · 1. Nov. ⋮
It is so fast and and efficacious that I have to take the right rythm, it feels like I have to run after the laser. Really incredible.
💬 ↻ ❤️ 3 📤



Take Home Message



Take Home Message



Thank you for your attention!



www.lisalaser.de