

## Personal information



조세례요한

**CHO, Seryeyohan**

- DOB: Jan. 7, 1990
- E-mail: sycho@handong.edu, 21439001@handong.edu, seycho@gmail.com
- Handong Intense Laser Lab. @ Handong University  
Solid-state Lasers, Laser beam Physics & Simulations
- Advising prof: Prof. Tae Jun YU, Handong University

## Education

2014–present	Handong University, Ph.D. in Engineering, Photonics <b>“Study of Thermal Effects and Consequent Spatio-temporal Beam Distortion of High-average-power Solid-state Lasers”</b>
2009–2014	Handong University, Dual B.S. in Mechanical Engineering and Electrical Control Engineering

## Skills

Languages	MATLAB, Mathematica, Julia
Software & Tools	LabView, CodeV, Solidworks, AutoCAD

# **Research Projects**

**The Competency Development Program for Industrial Specialist(Laser & Optical Applications)**  
(2019–present) funded by Ministry of Trade, Industry and Energy, Rep. of Korea

**CHF and contact angle change by laser shock peening**  
(2018–present) funded by National Research Foundation, Rep. of Korea

**Development of transparency and wavefront distortion measurement system for ceramic laser medium**  
(2018–present) funded by Korea Institute of Material Science

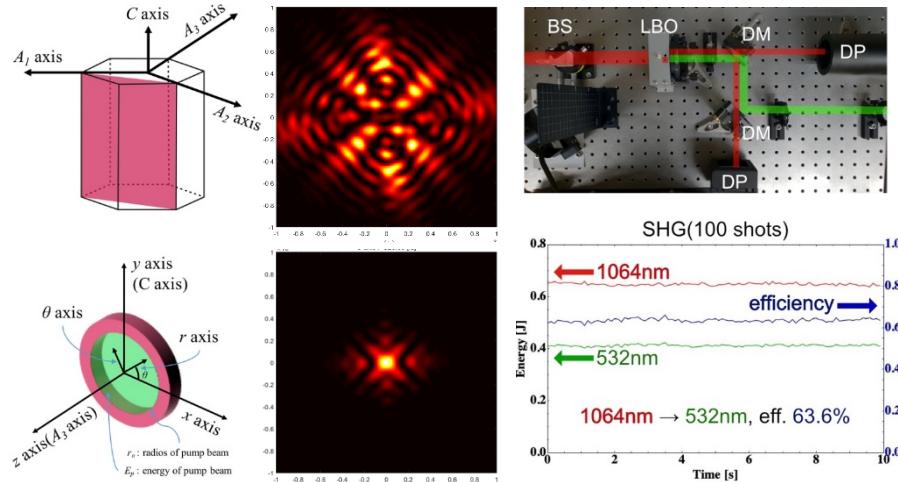
**Development of 125 J·Hz laser system for laser peening**  
(2014–2018) funded by Ministry of Trade, Industry and Energy, Rep. of Korea

[Undergraduate Research]  
**Development of a Vibration absorber for vehicle**  
(2012–2013) funded by Hyundai Motor Company

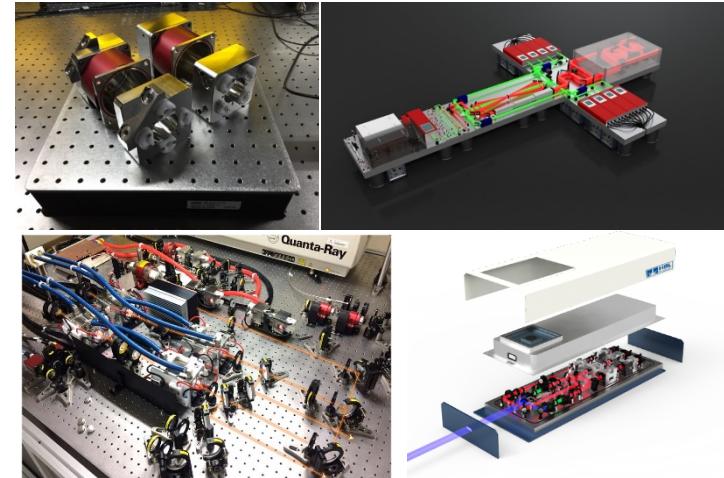
**Safety Analysis of Ultimate Heat Sinks of CANDU reactor**  
(2011–2012) funded partially by Foundation of Nuclear Safety and Ministry of Education, Science and Technology

# Research & Development: Overview

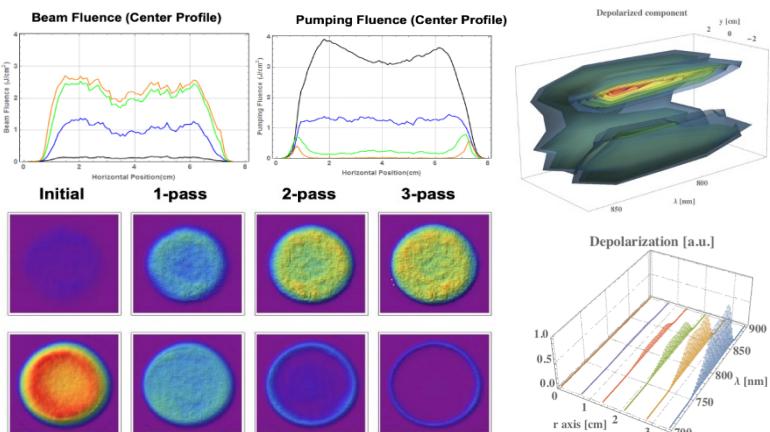
## Laser Science & Engineering



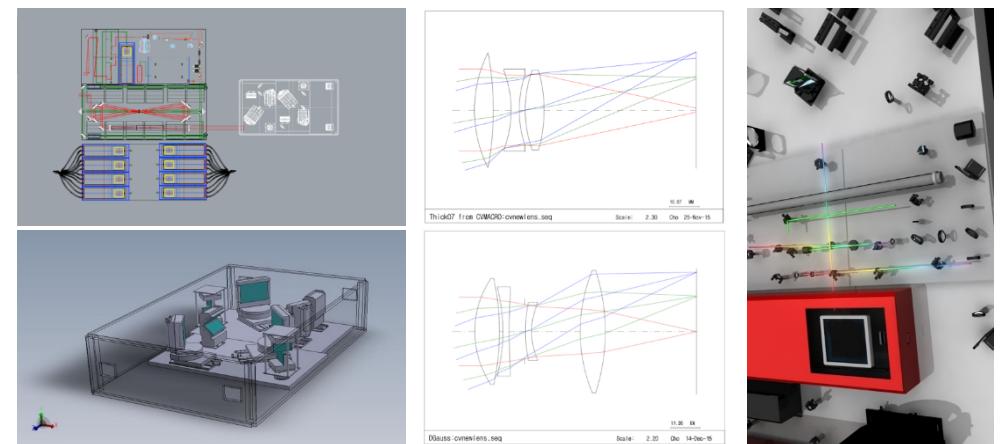
## High-power/energy Laser



## Laser-beam Simulation



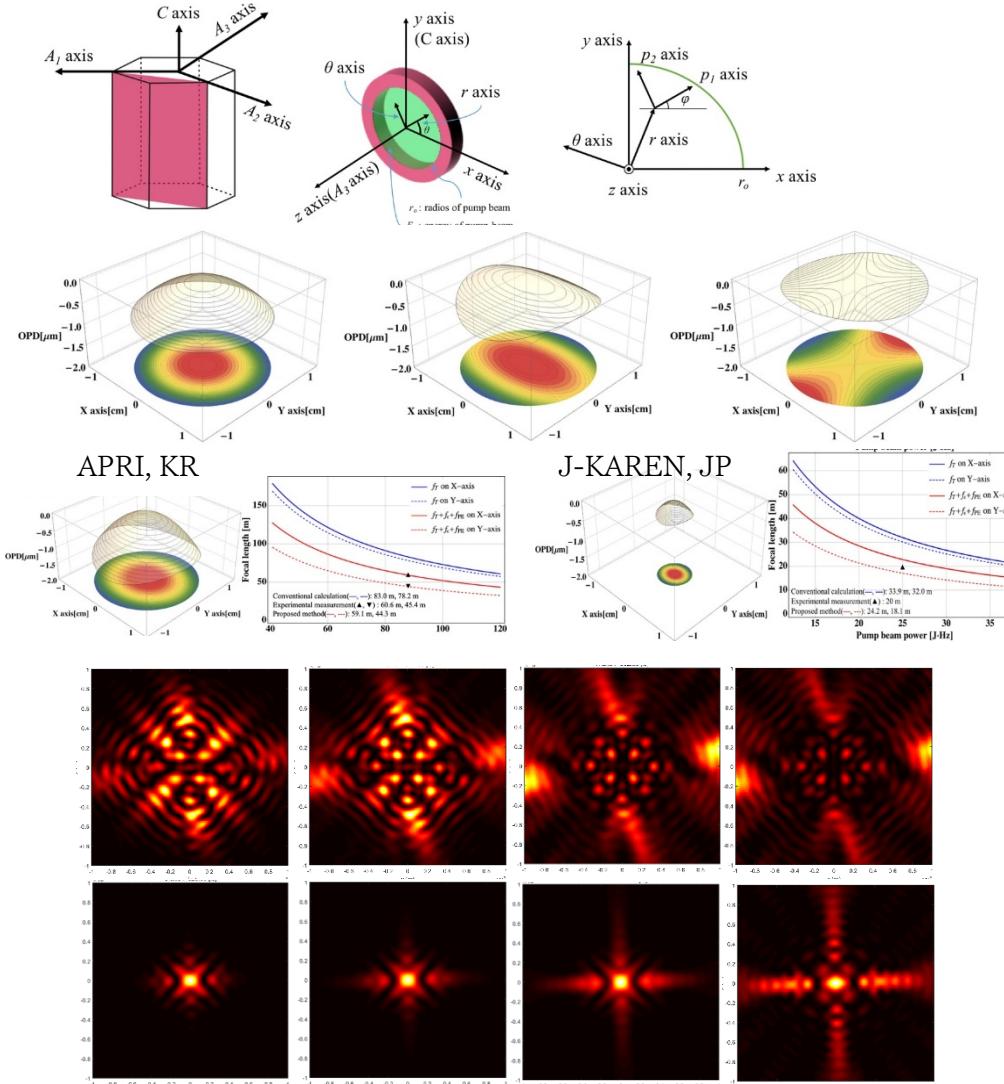
## CAD Tools



# Research Details: Laser Physics & Interferometer

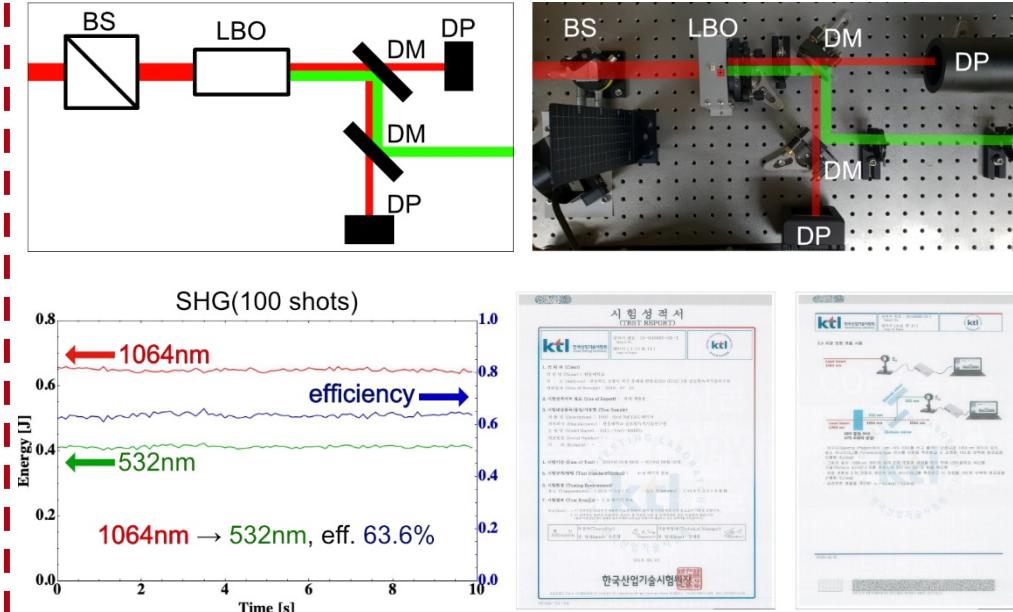
## Laser Crystal Analysis

### :Ti:sapphire Thermal Effect Analysis

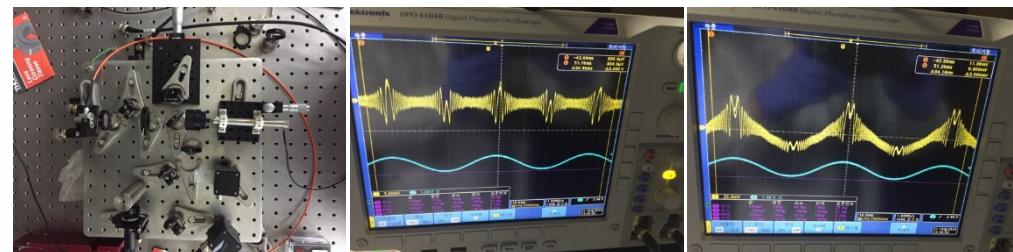


## Nonlinear Effect

### :Second Harmonic Generation(1064nm→532nm)



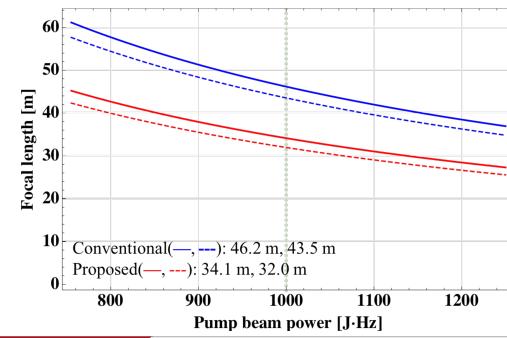
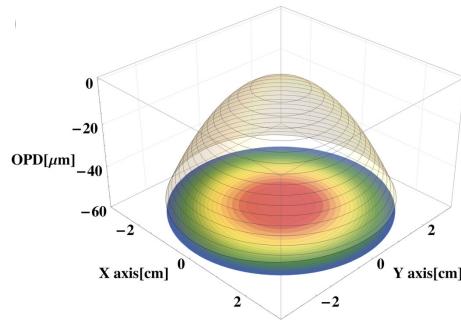
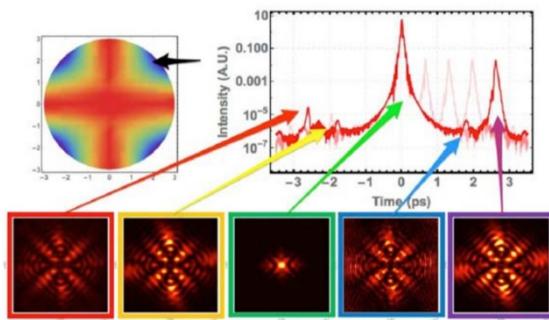
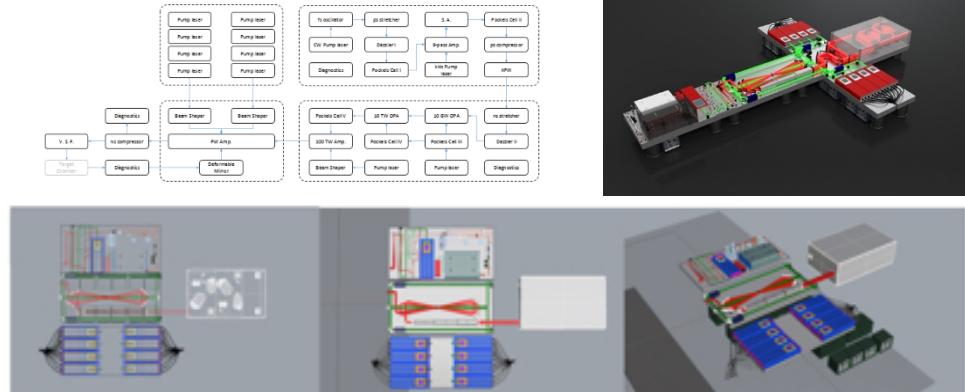
## White-light Interferometer



# Research Details: Solid-state Laser System Design

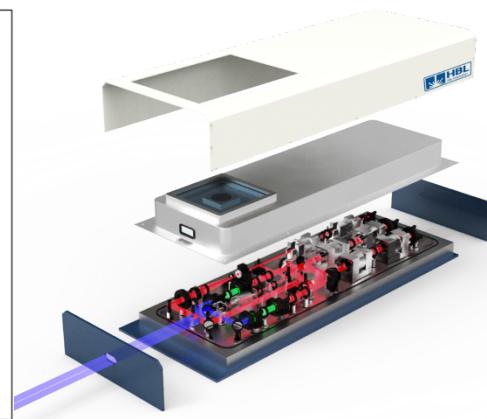
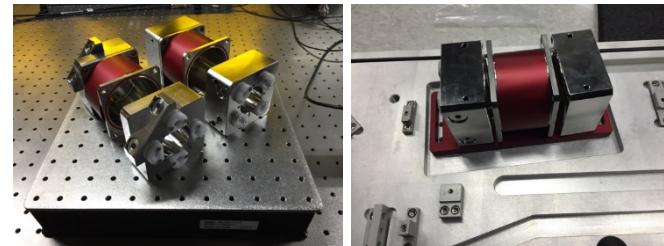
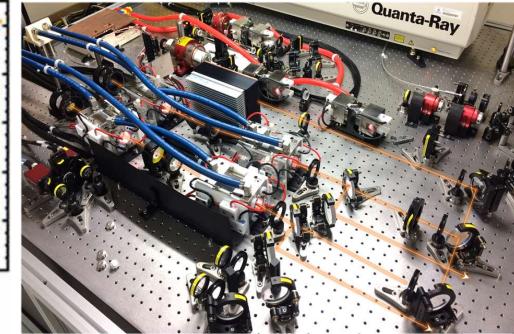
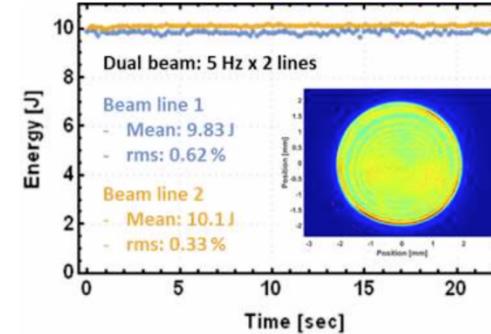
# High-Power Laser Design

:Compact 2 PW Laser system



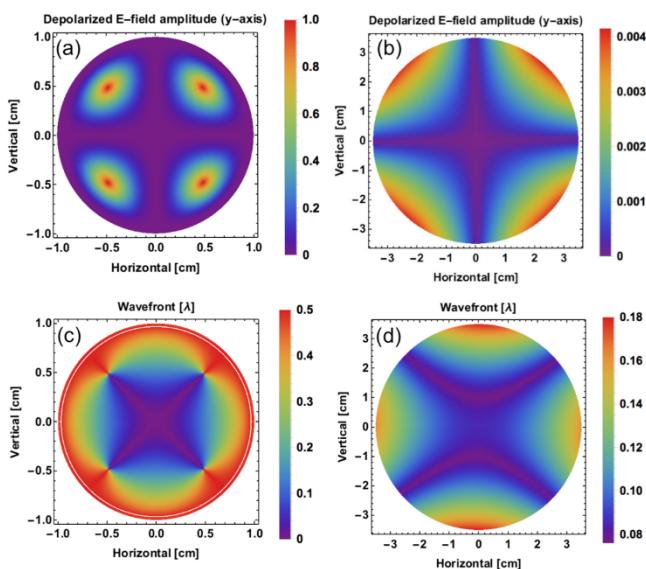
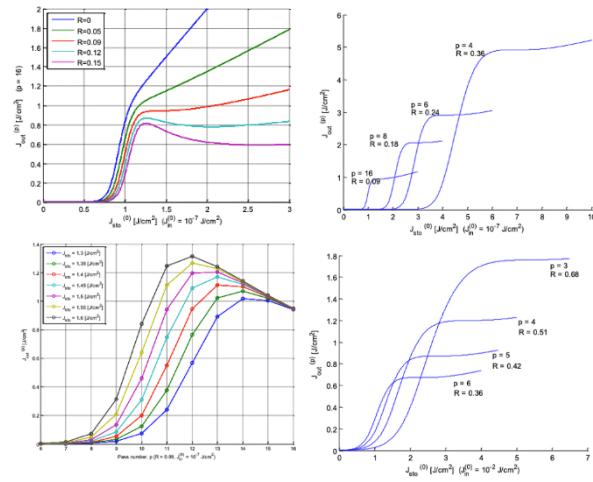
## High-energy Laser System Development

:10J, 10Hz for Laser Shock Peening

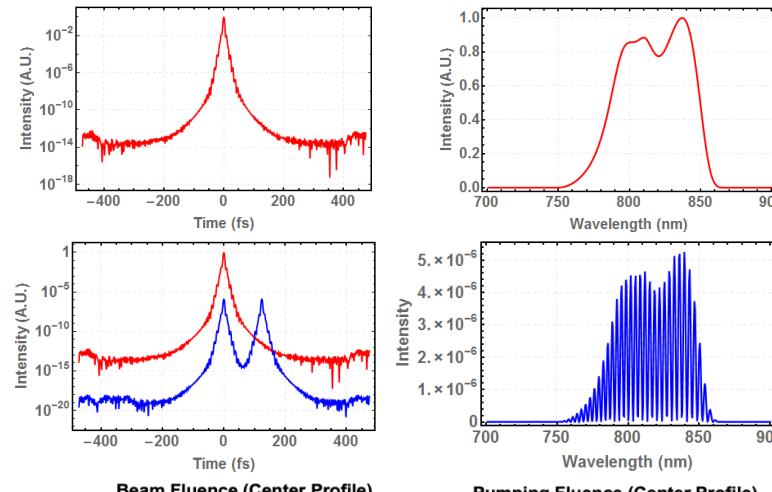


# Research Details: Laser-beam Simulation

## Laser Beam Amplification & Thermal Effect

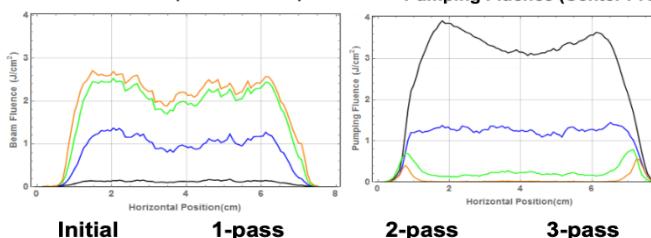


## Chirped-Pulse amplification 2D Amp. Simulation



Beam Fluence (Center Profile)

Pumping Fluence (Center Profile)

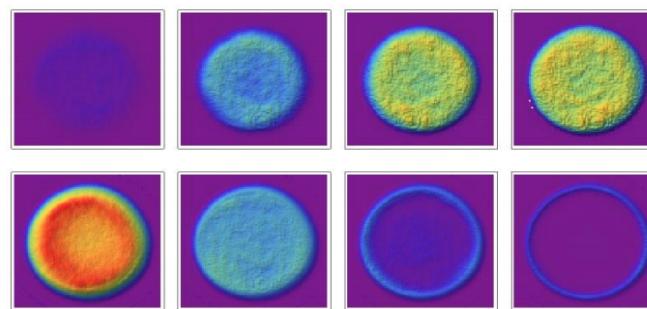


Initial

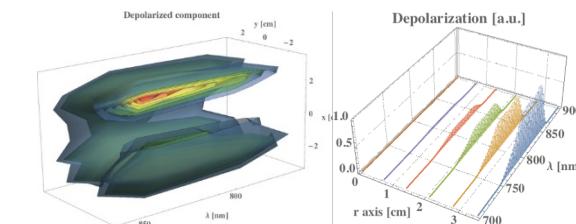
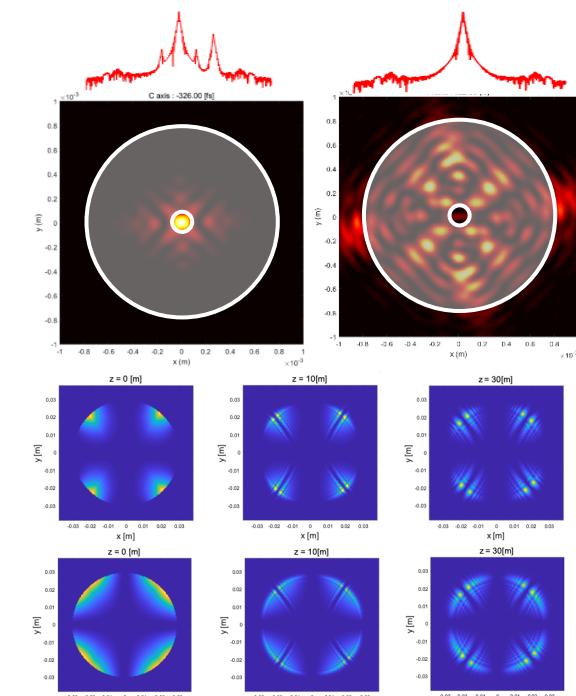
1-pass

2-pass

3-pass

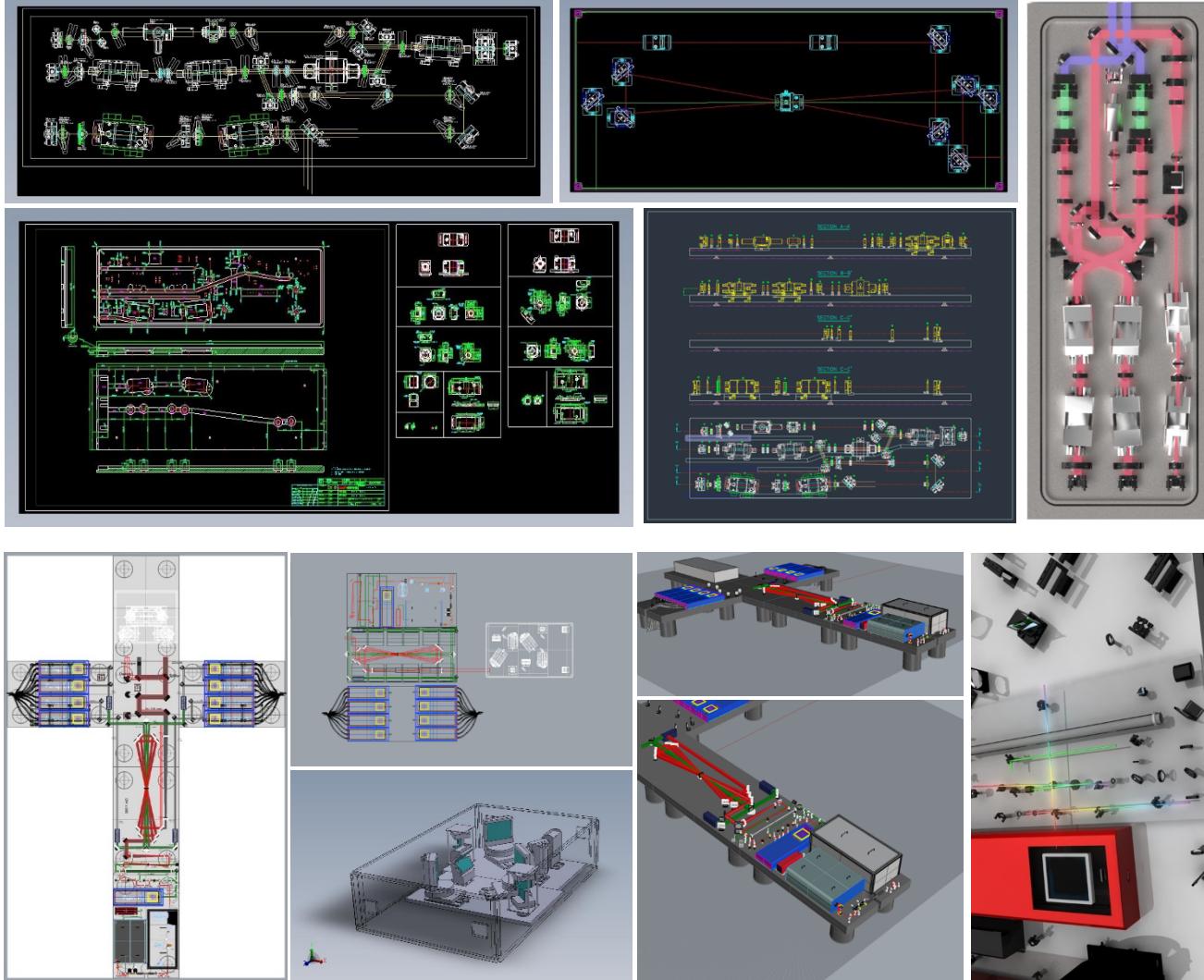


## Beam Propagating /Focusing Simulation

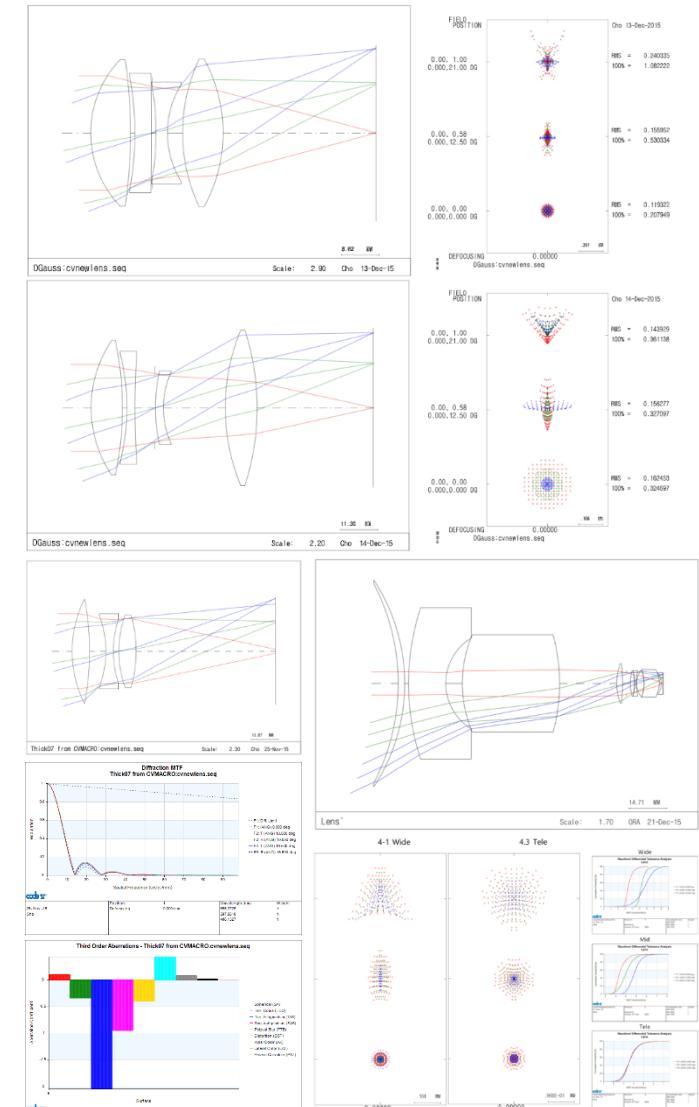


# Research Details: CAD tools

2D, 3D CAD tools



CodeV



# Publications: Journal papers

## Journal Papers

8. [Accepted] J. Jeong<sup>†</sup>, **S. Cho<sup>†</sup>**, S. Hwang<sup>†</sup>, B. Lee and T. J. Yu, “Modeling and Analysis of High-Power Ti:sapphire Laser Amplifiers—A Review,” *Appl. Sci.* (2019)
7. J. Jeong, **S. Cho**, S. Hwang, and T. J. Yu, “Amplified spontaneous emission suppression of saturable absorber in nano-second double-pass laser amplifier,” *Jpn. J. Appl. Phys.* **58**(2), 020901 (2019)
6. J. Jeong, **S. Cho**, S. Hwang, and T. J. Yu, “Frequency-Modulated Pulse-Amplification Method for Reducing Pulse Shape Distortion,” *J. Korean Phys. Soc.* **73**(11), 1637–1643 (2018)
5. **S. Cho**, J. Jeong, S. Hwang, and T. J. Yu, “Thermal lens effect model of Ti:sapphire for use in high-power laser amplifiers,” *Appl. Phys. Express* **11**, 092701 (2018)
4. S. Hwang, J. Jeong, **S. Cho**, J. Lee and T. J. Yu, “Femtosecond laser pulse distortion in Ti:sapphire multipass amplifier by atomic phase shifts,” *J. Korean Phys. Soc.* **71**(10), 652–656 (2017)
3. J. Jeong, **S. Cho**, T. Kim, and T. J. Yu, “Numerical extension of Frantz-Nodvik equation for double-pass amplifiers with pulse overlap,” *Opt. Express* **25**(4), 3946–3953 (2017)
2. **S. Cho**, J. Jeong and T. J. Yu, “Jones calculus modeling and analysis of the thermal distortion in a Ti:sapphire laser amplifier,” *Opt. Express* **24**(13), 14362–14373 (2016)
1. J. Jeong, **S. Cho**, T. Kim, and T. J. Yu, “Numerical Study of a Thermally-compensated High energy Double-pass Nd:YAG Amplifier Design,” *J. Korean Phys. Soc.* **68**(5), 653–657 (2016)

## Publications: Patent

Patent

4. 자연 증폭 방출 억제용 포화 흡수체를 가지는 고체 레이저 장치 Solid state laser apparatus having saturable absorber for suppressing amplified spontaneous emission

J. Jeong, **S. Cho**, S. Hwang, and T. J. Yu

KR Patent:10-2018-0086145(pending), US Patent: (pending), EU Patent: (Pending)

3. 레이저 펄스 필터 및 이를 구비한 레이저 출력 장치 Laser Pulse Filter and Device for Emitting Laser having the Same  
T. J. Yu, J. Jeong, T. Kim, **S. Cho**, and S. Hwang

KR Patent: 10-1884417(issued Jul. 26, 2018)

US Patent: 16-317034(pending), JP Patent: (pending)

- ## 2. 어레이 타입 레이저 증폭 장치 Device for Amplifying Array Rod Type

T. J. Yu, T. Kim, S. Cho, J. Jeong, and S. Hwang

KR Patent: 10-2017-0050346(pending)

- ## 1. 레이저 증폭장치 Laser Amplifier

T. J. Yu, J. Jeong, J. Kim, and S. Cho

KR Patent: 10-1739839(issued May 19, 2017)

US Patent: 15-568792(pending) CN Patent: 2015800791759(pending)

