











EDUCATION

Nanjing University	College of Engineering and Applied Sciences	Nanjing, Jiangsu
Doctor of Philosophy	Optical Engineering	Q.E. – Top 15%  Nonlinear Fourier Optics  2025 '27
Dissertation: “Analytic 3D vector linear non-uniform & nonlinear Fourier crystal optics in arbitrary $\bar{\epsilon}, \bar{\chi}$ dielectrics” 		
Master’s Studies	Quantum Electronics	Courses Score – 93.5  THz OAM Source  2022 '24
Northeastern University	School of Physics, College of Science	Shenyang, Liaoning
Bachelor of Science	Applied Physics	GPA Rank – 1/400  DDTank Aimbots  2020 '22
Thesis: “Research & design of nonlinear holography based on lithium niobate 3D nonlinear photonic crystal”  		
Freshman in College	Science	Sichuan Prov. – Top 2% 3 e-books with C++  2016 '18

RESEARCH PROJECTS

3D Vector Nonlinear Fourier Crystal Optics	Solving $\left[ (\nabla \times)^2 - k_0^2 \bar{\epsilon} \cdot \right] \mathbf{E}(\mathbf{r}) = k_0^2 \bar{\chi} : \mathcal{F}_\omega^{-1} \left[ \tilde{\mathbf{E}}_p \tilde{\mathbf{E}}_p \right] (\mathbf{r})$ analytically 2023.05
<ul style="list-style-type: none"><li>• test</li><li>• Reproduced well-known papers, some are purely experimental (too hard to model):<ul style="list-style-type: none"><li>• N.P. #proven theoretically wrong by this project #femtosecond pump</li><li>• O.E. #Bloembergen’s legacy2 #experiment  </li><li>• O.E.   Q.E. #high N.A. #<math>\bar{\chi}</math> anisotropy</li></ul></li></ul>	
Complex Vector Linear Fourier Crystal Optics	Analytic solution $\mathbf{E}(\mathbf{r})$ to $\left[ (\nabla \times)^2 - k_0^2 \bar{\epsilon} \cdot \right] \mathbf{E}(\mathbf{r}) = \mathbf{0}$ where $\epsilon_{ij} \in \mathbb{C}$ 2023.02
<ul style="list-style-type: none"><li>• Draw insights from PRS.A. M.V.Berry’s legacy   A.O.P.   J.QSRT.</li><li>• Reproduced well-known papers &amp; models with less time &amp; higher accuracy:<ul style="list-style-type: none"><li>• J.O.S.A. #Bloembergen’s legacy1</li><li>• JOSA.A.   O.E. #tightly focus #<math>\bar{\epsilon}</math> anisotropy</li></ul></li></ul>	
Real Scalar Nonlinear Fourier Crystal Optics	Closed-form $E_3(\mathbf{r})$ in $(\nabla^2 + k_3^2) E_3(\mathbf{r}) = -k_{03}^2 \chi(\mathbf{r}) E_1(\mathbf{r}) E_2(\mathbf{r})$ 2022.02
<ul style="list-style-type: none"><li>• Solving multivariable/field nonlinear convolution equations directly on my own</li><li>• Strong alternative to Green’s Function, pseudo-spectral, split-step Fourier methods</li><li>• Reproduced well-known papers &amp; models with higher both accuracy &amp; efficiency:<ul style="list-style-type: none"><li>• P.R.L. #Green   P.R.L. #experiment #quantum   P.R.L. #experiment #scatter   P.R.L.</li><li>• L.P.R. #SSF #quantum   Matlab #RCWA   A.P.L. #femtosecond pump   O.L.   P.R.A.</li></ul></li></ul>	

SCIENTIFIC ACTIVITIES

• Head Teaching Assistant at University Name	Spring 2019
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## ACADEMIC FOCUS

<b>Next generation</b> high N.A. 3D vector non-uniform analytic linear & nonlinear Fourier crystal optics	2024.06
!Paraxial $k_0^\omega$ <b>High N.A.</b> 3D vector non-uniform analytic linear & nonlinear Fourier crystal optics	2024.03
Emphasizing $G_{xyz}^\omega$ <b>3D</b> vector non-uniform analytic linear & nonlinear Fourier crystal optics	2023.12
Involving $\bar{\chi}_{\omega}^{(2)}$ anisotropy <b>Vector</b> non-uniform analytic linear & nonlinear Fourier crystal optics	2023.06
!Unitary $G_\omega^\pm \Leftarrow$ !Hermitian $\bar{\epsilon}_r^\omega \Rightarrow$ <b>Non-uniform</b> analytic linear & nonlinear Fourier crystal optics	2023.03
Solution $E_\omega^\pm$ to $(\nabla^2 + k_{\omega\pm}^2)E_\omega^\pm \propto P_{\omega\pm}^{(2)}$ <b>Analytic</b> linear & nonlinear Fourier crystal optics	2022.09
Solution $\mathcal{F}[E_3] = \mathcal{F}[f(\mathcal{F}^{-1}[\cdot])]$ to the Eq. below <b>Nonlinear</b> angular spectrum theory for SFG	2022.06
Solution $\mathcal{F}[E_3] = \iiint$ to $(\nabla^2 + k_3^2)E_3(r) \propto P_3^{(2)}(r)$ <b>Nonlinear</b> convolution solution to SFG	2022.03
Nonlinear THz LiNbO <sub>3</sub> -based metasurface <b>Quit THz project formally</b>   COMSOL	2022.01
BWOPO + THz optical parametric amplification	Mathematica   BookxNote Pro 2021.12
THz backward optical parametric oscillator (BWOPO)	Mathematica   VBA Excel 2021.11
Multi-cycle THz orbital angular momentum (OAM) source	RoamEdit   Blender 2021.11
Narrow-band THz OAM source via Optical Rectification (OR)	Python   Blender 2021.10
Electricity $\xrightarrow{\text{produce}}$ Acoustics $\xrightarrow{\text{modulate}}$ Optics	RoamEdit   VBA Excel 2021.07
Visible Photons $\xrightarrow{\text{SPDC}}$ THz Spectroscopy	BookxNote Pro   GeoGebra   VBA Excel 2021.06
Cavity Phase Matching = Sheet OPO	Paint 3D   RoamEdit   GeoGebra   VBA Excel 2021.05
THz Holography via Optical Rectification	Matlab   GeoGebra   VBA Excel 2021.01
Femtosecond laser $\xrightarrow{\text{Optical Rectification}}$ Terahertz (THz)	GeoGebra   VBA Excel 2020.12
Multicycle THz pulse generation by OR in LiNbO <sub>3</sub> ... crystals	VBA PowerPoinT 2020.10



















## SKILLS

- **Skill Group:** List of technologies
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## LANGUAGES

- **Language:** language proficiency level
- **EXAM:** details
- **Language:** language proficiency level
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## HONORS & AWARDS

Academia	Doctor's Qualification Exam (Oral) 	Excellent 	Top 15%	Nanjing U.	2024.01
	Bachelor Dissertation  & Defense 	Excellent 	1/90	Northeastern U.	2020.06
Competition	Three Provinces Achievement Expo 	Exhibition 	Leader	Three Prov.	2019.10
	"Challenge Cup" Tech Competition 	Grand prize 	Leader	Liaoning Prov.	2019.06
Scholarships & Fellowships	Academic Fellowship	1st class	¥40,000	Nanjing U.	2020-24
	"Jinchuan" Scholarship	1st place 	¥5,000	Northeastern U.	2019.04
	Academic Scholarship	1st place 	¥2,000	Northeastern U.	2018.06
	Entrance Scholarship	3rd place	¥5,000	Leshan No.1 H.S.	2013.09
Honors & Titles	Graduation with Honor 	Outstanding		Northeastern U.	2020.07
	League Member 	Excellent 		Northeastern U.	2019.11
	Undergraduate Student	Excellent 		Northeastern U.	2018.12
Memberships	Chinese Society for Optical Engineering	Member 		Nanjing U.	2021-25
	"Qian Sanqiang" Talent Class	Head 		I.H.E.P. 	2017-20

## EXTRACURRICULAR ACTIVITIES

- Member at Some Club 2017–Current  
*Detailed explanation of what you do at this club*
- Member at Some Club 2016–2017  
*Detailed explanation of what you do at this club*
- Volunteer at Some Event Fall 2019  
*Detailed explanation of what you do in this event*
- Volunteer at Some Event Winter 2015  
*Detailed explanation of what you do in this event*