Contents

Contributors

 Attosecond charge migration in organic molecules: Initiating and probing localized electron holes 	•
François Mauger, Sucharita Giri, Aderonke S. Folorunso, Kyle A. Hamer, Denawakage D. Jayasinghe, Kenneth Lopata, Kenneth J. Schafer, and Mette B. Gaarde	
1. Introduction	
2. Simulating charge migration with time-dependent density-functional theory	12
3. Initiating and probing localized electron holes: An attochemistry picture of charge migration	23
4. Summary and outlook	34
Acknowledgments	38
References	38
2. Strongly correlated excitons in moiré semiconductors	47
Tsung-Sheng Huang and Mohammad Hafezi	
1. Introduction	48
2. Summary on properties of transition metal dichalcogenides	50
3. Moiré excitons coexisting with charge-ordered states of doped electrons	58
 Correlations between moiré excitons: The role of nonbosonic exciton statistics 	65
5. Moiré excitons coexisting with spin-ordered states of doped electrons	70
6. Conclusion and outlook	78
Acknowledgment	80
Declaration of AI and AI-assisted technologies in the writing process	8
References	81
3. Phase-space methods for many-body quantum optics	87
Edgar Guardiola-Navarrete, Silvia Cardenas-Lopez, and Ana Asenjo-Garcia	
1. Introduction	88
2. Phase-space methods: Key concepts	90
3. Phase-space formulation for spins	101

4	. Phase-space methods for many-body quantum optics	110	
5	. Positive <i>P</i> representation	135	
6	. Summary and outlook	144	
A	cknowledgments	146	
A	appendix A. Continuous sampling method	146	
Æ	appendix B. Generalized dissipative TWA for other representations	148	
A	appendix C. Spin gauge <i>P</i> representation	149	
F	leferences	151	
I. F	Paraxial fluids of light	157	
_	Quentin Glorieux, Clara Piekarski, Quentin Schibler, angui Aladjidi, and Myrann Baker-Rasooli		
1	. Introduction and historical overview	158	
2	. Detailed theoretical framework	164	
3	3. What is the dimension of the system?	177	
4	. Adimensionalization and comparison with cold atoms	184	
5	i. Review of the experimental platforms	186	
6	i. Experimental and numerical techniques for fluids of light	200	
7	7. Recent experimental advances	216	
8	3. Future directions and perspectives	223	
ç	O. Conclusion	231	
F	Acknowledgements	231	
(Contributions of the authors	232	
F	References	232	