Resonant soft x-ray scattering and charge density waves in correlated systems

Rusydi, Andrivo

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2006

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):

Copyright
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the “Taverne” license. More information can be found on the University of Groningen website: https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment.

Take-down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): http://www.rug.nl/research/portal. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.
Acknowledgment

This thesis arose in part out of years of research that has been done since I came to Sawatzky’s group. By that time, I have worked with a great number of people whose contribution in assorted ways to the research and the making of the thesis deserved special mention. It is a pleasure to convey my gratitude to them all in my humble acknowledgment.

In the first place I would like to record my gratitude to George Sawatzky for his supervision, advice, and guidance from the very early stage of this research as well as giving me extraordinary experiences through out the work. Above all and the most needed, he provided me unflinching encouragement and support in various ways. His truly scientist intuition has made him as a constant oasis of ideas and passions in science, which exceptionally inspire and enrich my growth as a student, a researcher and a scientist want to be. I am indebted to him more than he knows.

I gratefully acknowledge Peter Abbamonte for his advice, supervision, and crucial contribution, which made him a backbone of this research and so to this thesis. His involvement with his originality has triggered and nourished my intellectual maturity that I will benefit from, for a long time to come. Pete, I am grateful in every possible way and hope to keep up our collaboration in the future.

Many thanks go in particular to Chi-Chang Kao and Steve Hulbert. I am much indebted to Chi-Chang for his valuable advice in science discussion, supervision in synchrotron and furthermore, using his precious times to read this thesis and gave his critical comments about it. I have also benefited by advice and guidance from Steve who also always kindly grants me his time even for answering some of my unintelligent questions about beam lines and synchrotron.

I gratefully thank Thomas Palstra and Sander van Smaalen for their constructive comments on this thesis. I am thankful that in the midst of all their activity, they accepted to be members of the reading committee.

It is a pleasure to pay tribute also to the sample collaborators. To Ivan Bozovic and G. Logvenov I would like to thank for their high quality Cuprates thin films. To Hiroshi Eisaki, Yousuke Fujimaki, and Shin-ichi Uchida who grew single crystal spin ladder samples: Domo arigato gozaimasu! I would also acknowledge Genda Gu for his single crystals BSCCO and LBCO. I would also like to thank W. N. Hardy, D. A. Bonn, and R. Liang for their high quality single crystals of YBCO.

I also benefited by outstanding works from Luc Venema’s help with his particular skill in handling precisely delicate equipments. The scattering chamber would not have been existed without him. Many thanks go to Donglai Feng for science discussion and the pleasure working together in the beam line.
To the role model for hard workers in the lab, L. H. Tjeng, I would like to thank him for being the first person who taught me how to work in ultra high vacuum system. I am proud to record that I had several opportunities to work with an exceptionally experienced scientist like him.

To Young-June Kim, it is a pleasure to collaborate with you. To Markus Hücke, and Jessica Thomas I am thankful for always helping me out in using the rotating anode and Laue machine. Thank to John Hill for letting me use his X22A beam line. Thank to Jae and Peter Stephens for the work collaboration we had at X6B. To Cecilia, thank for the opportunity to work at X13A, and hope you can get the new scattering chamber soon.

I would also acknowledge Jan Zaanen, Ian Affleck, Seiji Yunoki, John Tranquada, Chris Homes, Girsh Blumberg, Yang Ren, Adrian Gozar, and C. Schuessler-Langeheine for their advice and their willingness to share their bright thoughts with me, which were very fruitful for shaping up my ideas and research. Thanks to Ilya Elfmov and Mona Berciu for theoretical calculations, it was great to collaborate with you both.

I am very grateful to Michael Ruebhausen for the stimulating science discussion we had in Hamburg and invited me to come to Hamburg to show his beautiful in-house UT3 Raman Spectroscopy. I am looking forward to seeing the forthcoming VUV-FEL Raman spectroscopy.

To Tjip Hibma, thank for giving me the opportunity to work on your MBE equipment in Groningen. To Henk Bruinenberg, thank for your technical assistances and fun during the work we had in Groningen. It is also a pleasure to mention Szili (it was fun to collaborate with you and learnt how to grow thin films), Zhiwei Hu, Roger Chang, Hui-Huang Hsieh, Hong-Ji Lin and Di-Jing Huang for creating a pleasant working atmosphere in Taiwan.

My special thanks go to Peter Steeneken, without him; the “Samenvatting” of this thesis would be unintelligible to read at all due to my “poor” Dutch.

Furthermore, I would like to thank NSLS beam line support team: Anthony Lenhard, Gary Nintzel, Dennis Carlson, Michael Caruso, Shu Cheung, Rick Greene, Qing-Li Dong who were helping us in maintenance the beam line.

Collective and individual acknowledgments are also owed to my colleagues at RuG, NSLS, and UBC whose present somehow perpetually refreshed, helpful, and memorable. Many thanks go in particular to Alex Macridin, Karina Schulte, Mark James, Oana Rogojanu, Yutaka Furubayashi, for giving me such a pleasant time when working together with them since I knew them in RuG. Thanks to Elio Vescovo for the lunch meeting and dry humor about scientist’s life. Wei Ku, thanks for the science discussion and exhilarating time we spent together as game mate (also to Lisa for cooked me delicious Chinese food). Thanks to Lin Yang, Onur Mentes, Tsuneo Kageya, Tae Joo, and James Ablett for creating such a great friendship at the office, at the tennis court and many places in between. It is pleasure to mention: Wolfgang Caliebe, Peter Siddons, Mark Allaire,
Acknowledgement

Kenneth Evans-Lutterodt, Vivian Stojanov, for sharing various thoughts during the “Friday coffee break” in the late afternoon. To Sue Wirick for being such a good neighbor in the beamline, who always ready to lend a hand.

I convey special acknowledgement to Harry Jonkman, Eileen Morello, Lorraine Barry, Corrine Mesanna, Karen McKenzie, Anita Waterman for their indispensable help dealing with travel funds, administration and bureaucratic matters during my stay and my commute between The Netherlands, United States and the rest of the world so I could optimally carry out my research and travels. Yvonne van der Weerd, Diana Alfons and Elizabeth Woldringh, thank you for the kind help of the administration toward the ceremonial.

I was extraordinarily fortunate in having Tjia May On as my professor in Institut Teknologi Bandung. I could never have embarked and started all of this without his prior teachings in physics and thus opened up unknown areas to me. Thank you.

It is a pleasure to express my gratitude wholeheartedly to Sawatzky’s family for their kind hospitality during my stay in Vancouver.

Where would I be without my family? My parents deserve special mention for their inseparable support and prayers. My Father, Rusydi Rusyid, in the first place is the person who put the fundament my learning character, showing me the joy of intellectual pursuit ever since I was a child. My Mother, Ulvimariati, is the one who sincerely raised me with her caring and gently love. Febdian, Ilhamdi, and Anna, thanks for being supportive and caring siblings.

Words fail me to express my appreciation to my wife Lessy whose dedication, love and persistent confidence in me, has taken the load off my shoulder. I owe her for being unselfishly let her intelligence, passions, and ambitions collide with mine. Therefore, I would also thank Made Gunawan’s family for letting me take her hand in marriage, and accepting me as a member of the family, warmly. Furthermore, to de Jong family with their thoughtful support, thank you.

Finally, I would like to thank everybody who was important to the successful realization of thesis, as well as expressing my apology that I could not mention personally one by one.