ACKNOWLEDGMENTS

I would like to thank my academic adviser, professor Haojing Yan for his tremendous support and patience, *support and patience*.

I would like to extend my sincere gratitude to all the professors from the Physics Department of the University of Missouri, particularly to professor Sergei Kopeikin, professor Bahram Mashhoon and professor Angela Speck.

This thesis would not have been even started without my beloved parents, and certainly would not have been finished without support, help and love from my wife, Kristina Ulasovich.

I would particularly like to thank my grandmother, Razia Akhtyamova who taught me to look above the ordinary things and never stop dreaming.

Venera Khalikova, my friend, the coffee that you gave to me is responsible for some of the most creative chapters of this dissertation.

The computation for this work was performed on the high performance computing infrastructure provided by Research Computing Support Services and in part by the National Science Foundation under grant number CNS-1429294 at the University of Missouri, Columbia, MO.