ACKNOWLEDGEMENT

I would like to express my greatest appreciation and respect to Associate Professor Mohamed Hassan Eisa (M. H. Eisa), my M. Sc. adviser. The past two years spent in his group has been extremely beneficial. I saw unlimited patience, unsparing guidance, and unfailing trust. Above all, he always strives to help me succeed. I am full of gratitude to the Co Supervisor, Associate Professor Nabil Mohamed Maalij (medical physics), King Fahd University of Petroleum and Minerals (KFUP) Dhahran, Saudi Arabia, his broad scientific experience; constructive criticism and encouraging attitude have contributed greatly to this work. I am also owed my warm gratitude to Assistant Professor Saleh Ibrahim Al-Quraishi, Physics (Nanopartices) KFUP Dhahran, Saudi Arabia for his expert comments and constructive criticisms and efficient review of my work. And I am grateful to M. Sc. candidate Adekunle Hazeez Akintokun (medical physics) who teaches me MCNP. My humble thanks are due to the whole staff, Physics Department at (SUST) and staff, KFUP (library) for their kind help. This work reflects the input of many expertise people (colleagues, technicians and others) who were willing to share their time and knowledge with me, and who I gratefully acknowledge. Sincere thanks are also directed to my parents, brother and sisters for always encouraging me to aim as high as I possibly wanted and for always telling me that if I wanted to achieve something. My warm thanks to my wife and sons for their love. This work was carried out at the Physics Department, College of Science in Sudan University of Science and Technology, during the years 2008-2011.

Habib