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## Prof S.R. Naidoo

Position: Associate Professor  
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### Research Interests

Ion Beam modification of materials. The enhancement of the optical, electrical and mechanical properties of materials by ion implantation.

### Publications

#### Refereed journal papers

1. Surface Brillouin scattering on annealed ion-implanted CVD diamond. I. Motochi, S.R. Naidoo, B.A. Mathe, R. Erasmus, E. Aradi, T.E. Derry, E.J. Olivier. *Diamond and Related materials*, 56, (2015), pp. 6-12.
2. Raman studies on the effect of multiple energy ion implantation on single crystal hexagonal boron nitride. E. Aradi, S. R. Naidoo, R. M. Erasmus, B. Julies, T. E. Derry (Submitted and accepted in *Radiation effects and defects in Solids*, July 2014. Manuscript ID: Grad-2014 0127.
3. Electron microscopy profiling of ion implantation damage in diamond: dependence on fluence and annealing. E Nshingabigwi, T E Derry, SR Naidoo, CM Levitt, EJ Olivier, JH O'Connell, JH Neethling. *Diamond and Related materials*, 49, (2014), pp. 1-8
4. Ion Beam Modification of the Structure and Properties of Hexagonal Boron Nitride: An Infrared and X-ray Diffraction Study. Aradi E, Naidoo SR, Billing D, Wamwangi D, Motochi I, T E Derry, *Nuclear Instruments and Methods in Physics Research B* 331 (2014) pp. 140-143.
5. Investigations on the characterization of ion implanted hexagonal boron nitride. Aradi E, Naidoo SR, Erasmus RM, Julies B, Derry TE. *Nuclear Instruments and Methods in Physics Research B* 307 (2013) pp. 214-217.



6. Ion beam synthesized colloidal silver nanoclusters in crystalline sapphire as third-order optical material. A Kozakiewicz, B Gosh, P Chakaroborty, T E Derry, S R Naidoo, P Franklyn IEEE Photonics Journal, Vol. 4, No. 1 (2012).
7. Thermally induced amorphous to crystalline transformation of argon ion bombarded GaAs studied with surface Brillouin and Raman Scattering. K Jakata, D M Wamwangi, C Sumanya, R M Erasmus, S R Naidoo, J D Comins. Nuclear Instruments and Methods in Physics Research B (2012), doi:10.1016/j.nimb.2011.12.067. [refereed journal article, 0 citation]
8. Cross-section transmission electron microscopy of the ion implantation damage in annealed diamond. T E Derry, E K Nshingabigwi, M Levitt, J Neethling, S R Naidoo. Nuclear Instruments and Methods in Physics Research B 267, 2705-2707, (2009).
9. Krypton induced surface modification of polycrystalline titanium. M Topic, S Nsengiyumva, R Bucher, S R Naidoo, T E Derry, C M Comrie, C Theron, D T Britton, and M Harting. Surface & Coatings Technology, Vol. 201(2007), 5621-5267.
10. Near surface stress determination in Kr-implanted polycrystalline titanium by the X-ray  $\sin^2 \Psi$  method. M Harting, S Nsengiyumva, A T Raji, G Dollinger, P Sperr, S R Naidoo, T E Derry, C M Comrie and DT Britton. Surface & Coatings Technology, Vol. 201(2007), 8237-8241.
11. Effects of  $\text{Ag}^+$  and  $\text{Au}^{3+}$  ion implantation of lithium niobate. G O Amolo, J D Comins, S R Naidoo, S H Connell, M J Witcomb and T E Derry. Nucl. Instr. and Meth. B. Vol. 250(2006), 233-237.
12. Range parameters of aluminium implants in medium and heavy mass metals. M Hayes, T Hauser, E Friedland, S J Thugwane, J B Malherbe and S R Naidoo. Nuclear Instruments and Methods in Physics Research B, 161-163, (2000), 150- 154.
13. Study of diffusion behaviour of aluminium in silicon up to 900 °C by nuclear reaction analysis. T Hauser, E Friedland and S R Naidoo, Nuclear Instruments and Methods in Physics Research B, 161-163, (2000), 656- 662.
14. Quantitative trace hydrogen distributions in natural diamond using 3D-micro-ERDA microscopy. R D Maclear, J E Butler, S H Connell, B P Doyle, I Z Machi, S R Naidoo and J P F Sellschop and E Fritsch. Nuclear Instruments and Methods in Physics Research B, 136-138(1998), 579-582.
15. Electroluminescence from electron injection junctions created by carbon and



phosphorus ion implantation. S R Naidoo and J F Prins. *Diamond and Related materials*, (8), 8 (1999), 1502-1507. Data from this paper has been included in the reference book **“Optical properties of Diamond: A Data Handbook”**, Springer-Verlag, Berlin, Heidelberg, New York, 2001 by A M Zaitsev. Also **“Handbook of spectral lines in diamond”**, B Dischler, ISBN 978-3-642-22214-6 e-ISBN 978-3-642-22215-3 DOI 10.1007/978-3-642-22215-3, Springer Heidelberg Dordrecht London New York, Library of Congress Control Number: 2012934366, Springer-Verlag Berlin Heidelberg 2012.

16. Superconductivity and antiferromagnetism in Cr-Mo-Ru Alloys. H L Alberts, D S McLachlan, T Germishuys, and M Naidoo. *J. Phys.: Condens. Matter* 3 (1991) 1793-1800.

#### Refereed Conference papers

1. Aberration corrected (S)TEM analysis of {00} platelets in natural diamond. E.J. Olivier, J.H. Neethling, R.E. Kroon and S.R. Naidoo, 52<sup>nd</sup> Annual conference of the Microscopy Society of South Africa, University of Pretoria, 29 Nov-4 Dec 2015. ISSN (awaiting final publication)
2. Surface Brillouin scattering in ion-implanted chemical vapor deposited diamond. I. Motochi, S. R. Naidoo, B. A. Mathe, R. Erasmus, E. Aradi, T. E. Derry and J. D. Comins (Manuscript accepted for publication. Proceedings of the International conference on Diamond and Carbon Related Materials: SI:DCM 2014 to be published in *Materials Today* (2015)).
3. COMPARISON OF SIMULATED AND EXPERIMENTAL HRTEM IMAGES OF {001} PLATELETS IN TYPE Ia DIAMOND. J.H. Neethling, E.J. Olivier, R.E. Kroon and S.R. Naidoo. 52<sup>nd</sup> Annual conference of the Microscopy Society of South Africa, Stellenbosch, 3-6 Dec 2014.
4. TEM AND EELS STUDY OF C+ IMPLANTED AND ANNEALED DIAMOND. S.R. Naidoo, E.J. Olivier and J.H. Neethling. 52<sup>nd</sup> Annual conference of the Microscopy Society of South Africa, Stellenbosch, 3-6 Dec 2014.
5. HAADF STEM analysis of {001} platelets in diamond. Olivier EJ, Neethling JH, Naidoo SR, 51<sup>st</sup> Annual conference of the Microscopy Society of South Africa, Pretoria, 3-6 Dec 2013. ISSN 0250-0418, ISBN 0-620-35056-3.
6. HRETM analysis of {001} platelets in diamond. Neethling J.H., Olivier E.J., Naidoo S.R., Nshingabigwi E.K., Derry T.E., Levitt C.M. and O’Connell J.H. Proceedings of the Microscopy Society of Southern Africa, 42, p. 65. (2012), Cape Town, South Africa, 4<sup>th</sup>-7<sup>th</sup> December 2012. ISSN 0250-0418: ISBN 0-620-350356-3.



7. Transmission electron microscopy investigation of the radiation damage in diamond caused by carbon ion implantation in single-crystal diamond. Naidoo S.R., Nshingabigwi E.K., Neethling J.H., Olivier E.J., O'Connell J.H., Levitt C.M. and Derry T.E. Proceedings of the Microscopy Society of Southern Africa, 42, p. 66, Cape Town, South Africa, 4<sup>th</sup>-7<sup>th</sup> December 2012. ISSN 0250-0418: ISBN 0-620-350356-3..
8. Investigation of the Isochronal Annealing of Argon Ion Beam Amorphised GaAs with Raman and Surface Brillouin Scattering. Jakata K., Wamwangi D., Sumanya C., Mathe B.A., Erasmus R.M., Comins J.D., Naidoo S.R. and Derry T.E. Proceedings of the 18<sup>th</sup> World Conference on Non-Destructive Testing, Durban, South Africa, 16<sup>th</sup>-20<sup>th</sup> April 2012. ISBN: 978-0-620-52872-6. 2012(published online on [www.ndt.net2012](http://www.ndt.net2012)).
9. Ion irradiation effects on the formation of metal nanoparticles in crystals. Anna Kozakiewicz, Trevor Derry, Paul Franklyn, S R Naidoo, Chris Theron Proc. of SAIP2011, the 56<sup>th</sup> Annual Conf. of the S.A. Institute of Physics, Pretoria, July 2011, ed. I. Basson & A.E. Botha, pp. 156-161; ISBN 978-1-86888-688-3; <http://www.saip.org.za>
10. *Ab initio* structural and electronic study of metals on diamond (111)-(1X1) surface. I Motochi, N W Makau, G O Amolo, B A Mathe, S R Naidoo. Proc. of SAIP2011, the 56<sup>th</sup> Annual Conf. of the S.A. Institute of Physics, Pretoria, July 2011, ed. I. Basson & A.E. Botha, pp. 207-213; ISBN 978-1-86888-688-3; <http://www.saip.org.za>
11. Transmission Electron Microscopy Investigation of Radiation Damage Caused by keV Implantation in Single-crystal Diamond. Emmanuel Korawinga Nshingabigwi, Jan Neethling, C.M. Levitt, S.R. Naidoo, T.E. Derry. Proc. of SAIP2011, the 56<sup>th</sup> Annual Conf. of the S.A. Institute of Physics, Pretoria, July 2011, ed. I. Basson & A.E. Botha, pp. 711-714; ISBN 978-1-86888-688-3; <http://www.saip.org.za>
12. Raman characterization of the phase transition of ion implanted hexagonal boron nitride to cubic boron nitride Nanoparticles. E Aradi, S R Naidoo, R M Erasmus, T E Derry. Proc. of SAIP2011, the 56<sup>th</sup> Annual Conf. of the S.A. Institute of Physics, Pretoria, July 2011, ed. I. Basson & A.E. Botha, pp. 652-657; ISBN 978-1-86888-688-3; <http://www.saip.org.za>
13. Vacancy and Krypton dynamics in Kr-implanted naturally oxidised aluminium. M Harting, D F Kanguwe, C M Comrie, S Nsengiyumva, SR Naidoo, T E Derry and DT Britton. Materials Science Forum. Vol. 445-446 (2004), 102-105.

## Special Interests



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Radiation damage in diamond caused by ion ion implantation as analysed by Raman Spectroscopy, Surface Brillouin Scattering and High resolution Transmission Electron Microscopy. The diamond-metal interface and the electronic properties of ion implanted diamond and nano-diamond. Phase transformation of materials by ion implantation.

## Affiliations

Member of the South African Institute of Physics (SAIP).

## Other Interests

Jazz Musician. 2 Albums released with band 'Absolute Zero' (Spirit and Ballad for Africa). And I try to play Golf.

## Teaching

Undergraduate teaching for PHYS1014 (engineering) and Physics 1001/6.

## Postgraduate supervision

- E. Nshingabigw, PhD (2013)
- A Kozakiewicz, PhD (accepted, awaiting student corrections)
- E. Aradi, PhD (2014)
- I.S. Motochi, PhD (2015)
- T.T. Ngwekhulu, MSc (Current)
- T. Matindi, PhD (Current)
- P. Mwonga, PhD (Current)
- A.A. Adwele, PhD (waiting student visa)
- A. Ismaila, PhD (waiting student visa)