

Curriculum Vitae

A. Name: **Umakant D. Rapol**

B. Position: Associate Professor

C. Department: Physics Department

D. Institution: Indian Institute of Science Education and Research – Pune

E. Academic and Professional career

<u>Degree/Position held</u>	<u>Year(s)</u>	<u>University/Institution</u>
B.Sc	1994	DBF Dayanand College of Arts and Science, Solapur – India
M.Sc.	1996	University of Pune, Pune – India
Ph. D.	2003	Indian Institute of Science, Bangalore – India
Visiting Researcher	2003-2004	Ecole Normale Superieure, Paris – France
Visiting Researcher	2004–2005	University of Innsbruck, Innsbruck – Austria
Lead Scientist	2005–2009	Micro and Nano Structures Technology Division General Electric Global Research, JFWTC Bangalore – India
Assistant Professor	2009 – 2017	Indian Institute of Science Education and Research, Pune – India
Associate Professor	2017 –	Indian Institute of Science Education and Research, Pune – India

F. **List of publications**

Patents

1. S. Maity, S. Vartak, and **U. Rapol**. Fringe locking subsystem and methods of making and using the same (2013). **US Patent 8,363,224 B2**
2. S. Maity, **U. Rapol**, S. Vartak, R. Langoju, A. Patil, A. Rammohan, *et al.* Systems and methods for detection and imaging of two-dimensional sample arrays (2012). **WO Patent 2,012,057,681**. and A. Patil, S. Maity, V. Langoju, A. Rammohan, S. Vartak, and **U. Rapol**. Systems and methods for detection and imaging of two-dimensional sample arrays (2012). **US Patent 2012/0,105,852**.

3. E. Calla, S. Maity, **U. Rapol**, and A. Silvia. Welding control system (2009). US Patent App. 12/491,158. **and** E. Calla, S. Maity, **U. Rapol**, and A. Silvia. Schweißsteuerungssystem (2010). **DE Patent App. (German Patent) 102,010,017,316.**
4. A. Banerjee, S. Maity, M. Pietzykowski, and **U. Rapol**. Method and apparatus for detection of analytes (2008). **US Patent App. 12/331,713.**
5. R. Rao, **U. Rapol**, T. Asokan, and S. Ungarala. Arc detector (2008). EP Patent 1,993,181. **and** R. Rao, **U. Rapol**, T. Asokan, and S. Ungarala. Arc detector (2007). **US Patent App. 11/747,970.**
6. S. Maity, S. Vartak, V. Rao, M. Yamada, S. Chandrasekaran, A. Patil, A. Banerjee, and **U. Rapol**. Optical detection systems and methods of making and using the same (2010). **US Patent App. 12/751,457.**
7. K. Tandon, **U. Rapol**, U. Barik, and R. Vetrivel. Composite membrane for separation of carbon dioxide (2010). **US Patent 7,811,359.**

Publications in Refereed International Journals

1. Sumit Sarkar, Jay Mangaonkar, Chetan Vishwakarma, and **Umakant D. Rapol**, “Diffraction of an atom laser in the Raman-Nath regime” **Phys. Rev. A** **98**, 043625 (2018)
2. Sumit Sarkar, Sanku Paul, Gunjan verma, Chetankumar Vishwakarma, Sunil Kumar, M. Sainath, **Umakant D. Rapol**, and M. S. Santhanam, “Non exponential decoherence in an atom-optics kicked rotor” **Phys. Rev. Lett** **118**, 174101 (2017)
3. Gunjan Verma, **Umakant D. Rapol** and Rejish Nath, “Generation of dark solitons and their instability dynamics in two-dimensional condensates”, **Phys. Rev. A** **95**, 043618 (2017)
4. Gunjan Verma, Chetankumar Vishwakarma, C. V. Dharmadhikari and **Umakant D. Rapol**, “A compact atomic beam based system for Doppler-free laser spectroscopy of strontium atoms” **Rev. Sci. Instrum.** **88**, 033103 (2017).
5. Kumar, S., Sarkar, S., Verma, G., Vishwakarma, C., Noaman, Md. and **Rapol, U**, “Bose-Einstein Condensation In An Electro-Pneumatically Transformed Quadrupole-Ioffe Magnetic Trap” **N. J. Phys.** **17** 023062 (2015)

6. L. Tsakalakos, J. Balch, J. Fronheiser, M. Shih, S. LeBoeuf, M. Pietrzykowski, P. Codella, B. Korevaar, O. Sulima, J. Rand, Anilkumar Davuluru and **Umakant Rapol**, “Strong broadband optical absorption in silicon nanowire films”, **J. Nanophotonics** **1**(1), 013552 (2007)
7. J. Benhelm, G. Kirchmair, **U. Rapol**, T. Körber, C. Roos, and R. Blatt, “Measurement of the hyperfine structure of the $S_{1/2} - D_{5/2}$ transition in $^{43}\text{Ca}^+$ ”, **Phys. Rev. A** **75**(3), 032506 (2007).
8. J. Benhelm, G. Kirchmair, **U. Rapol**, T. Körber, C. Roos, and R. Blatt, “Erratum: Measurement of the hyperfine structure of the $S_{1/2} - D_{5/2}$ transition in $^{43}\text{Ca}^+$ [Phys. Rev. A 75, 032506 (2007)]”, **Phys. Rev. A** **75**(049901), 049901 (2007).
9. S. Moal, M. Portier, J. Kim, J. Dugué, **U. Rapol**, M. Leduc, and C. Cohen-Tannoudji, “Accurate determination of the scattering length of metastable helium atoms using dark resonances between atoms and exotic molecules”, **Phys. Rev. Lett.** **96**(2), 23203 (2006).
10. H. Häffner, W. Hänsel, C. Roos, J. Benhelm, *et al.*, “Scalable multiparticle entanglement of trapped ions”, **Nature** **438**(7068), 643 (2005).
11. H. Häffner, F. Schmidt-Kaler, W. Hänsel, C. Roos, T. Körber, M. Chwalla, M. Riebe, J. Benhelm, **U. Rapol**, C. Becher, *et al.*, “Robust entanglement”, **App. Phys. B** **81**(2), 151 (2005).
12. J. Kim, **U. Rapol**, S. Moal, J. Léonard, M. Walhout, and M. Leduc, “Photoassociation experiments with ultracold metastable helium”, **Euro. Phys. J. D** **31**(2), 227 (2004).
13. **U. Rapol**, A. Krishna, A. Wasan, and V. Natarajan, “Laser cooling and trapping of Yb from a thermal source”, **Euro. Phys. J. D** **29**(3), 409 (2004).
14. A. Banerjee, D. Das, **U. Rapol**, and V. Natarajan, “Frequency locking of tunable diode lasers to a rubidium-stabilized ring-cavity resonator”, **App. Opt.** **43**(12), 2528 (2004).
15. **U. Rapol** and V. Natarajan, “Doppler-free spectroscopy in driven three-level systems”, **Eur. Phys. J. D** **28**(3), 317 (2004).
16. **U. Rapol**, A. Wasan, and V. Natarajan, “Subnatural linewidth in room-temperature Rb vapor using a control laser”, **Phys. Rev. A** **67**(5), 053802 (2003).

17. **U. Rapol**, A. Krishna, and V. Natarajan, “Precise measurement of hyperfine structure in the $5P_{3/2}$ state of Rb”, **Euro. Phys. J. D** **23**(2), 185 (2003).
18. A. Banerjee, **U. Rapol**, D. Das, A. Krishna, and V. Natarajan, “Precise measurements of UV atomic lines: Hyperfine structure and isotope shifts in the 398.8 nm line of Yb”, **Euro. Phys. Lett.** **63**, 340 (2003).
19. **U. Rapol**, A. Wasan, and V. Natarajan, “Observation of sub-natural linewidths for cold Rb atoms in a magneto-optic trap”, **Euro. Phys. Lett.** **61**, 53 (2003).
20. **U. Rapol** and V. Natarajan, “Precise measurement of hyperfine intervals using avoided crossing of dressed states”, **Euro. Phys. Lett.** **60**, 195 (2002).
21. A. Banerjee, **U. Rapol**, and V. Natarajan, “Direct measurement of the fine-structure interval in alkali atoms using diode lasers”, **App. Phys. Lett.** **80**, 3688 (2002).
22. A. Banerjee, **U. Rapol**, A. Wasan, and V. Natarajan, “High-accuracy wavemeter based on a stabilized diode laser”, **App. Phys. Lett.** **79**, 2139 (2001).
23. U. D. Rapol, A. Wasan, and V. Natarajan, “Loading of a Rb magneto-optic trap from a getter source”, **Phys. Rev. A** **64**, 023402 (2001).

Conference Proceedings

1. C. Becher, H. Barros, J. Benhelm, D. Chek-al Kar, M. Chwalla, H. Häffner, W. Hänsel, T. Körber, T. Monz, E. Phillips, **U. Rapol**, M. Riebe, C. Roos, C. Russo, P. Schmidt, O. Gühne, W. Dür, and R. Blatt. Entanglement of trapped ions. In *Conference on Lasers and Electro-Optics and 2006 Quantum Electronics and Laser Science Conference, CLEO/QELS 2006*, p. 4629048 (2006).
2. **Rapol, U.D.** and Häffner, H. and Riebe, M. and Roos, C. and Hänsel, W. and Chwalla, M. and Benhelm, J. and Körber, T. and Lancaster, G. and James, D.F.V. and Schmidt-Kaler, F. and Blatt, R. Application of process tomography to quantum teleportation. In *Quantum Electronics Conference, 2005. EQEC'05. European*, p. 309 (IEEE, 2005).
3. T. Körber, C. Roos, W. Hänsel, **U. Rapol**, M. Chwalla, J. Benhelm, D. Chek-al kar, M. Riebe, H. Häffner, F. Schmidt-Kaler, and R. Blatt. Observation of very long-lived entanglement. vol. 2005, p. 314 (2005). In *Quantum Electronics Conference, 2005. EQEC'05. European*, p. 314 (IEEE, 2005).

4. **U. Rapol**, A. Wasan, and V. Natarajan, “Laser cooling and tapping of Rubidium and Ytterbium atoms”, *Physics with cold atoms* p. 17 (2001).

General Articles

1. V. Natarajan, A. Banerjee, and **U. Rapol**, “Experiments with a laser-cooled cloud of atoms”, *Current Science* **76**, 216 (1999).