

Dr. Srinivas Krishnagopal

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Srinivas Krishnagopal completed his Masters in Physics from the Indian Institute of Technology Bombay in 1985, and his Ph.D. in accelerator physics from Cornell University, in 1990. During his Ph.D. he worked, with Bob Siemann, on the beam-beam interaction in colliders, and made important contributions to the understanding of bunch-length effects in the beam-beam interaction, and beam-energy inequality. In particular he studied the dynamics of round-beam colliders: this included a study of the beam-beam compensation experiment at DCI.

From 1990-92 he worked at the Lawrence Berkeley Laboratory, with Andy Sessler, on free-electron laser theory. This included a study of resonator stability, and new concepts such as the multi-cavity FEL, and design of a proposed infrared FEL. At LBL he also performed some of the first full-fledged simulations of collective effects in the beam-beam interaction, for round beams.

Srinivas returned to India in 1993, and joined the Centre for Advanced Technology, where he has been since. Initially he worked on accelerator theory. He extended his earlier work on collective effects in colliders, by writing a PIC code to study beam-beam dynamics with the more realistic flat beams, and was able to show, in simulations, the collective period-n oscillations that were observed to limit the luminosity at LEP. He also worked on the beam-beam interaction in asymmetric colliders and on symmetry-breaking and energy-transparency in the beam-beam interaction. In addition, he proposed a new FEL concept, the two-colour FEL, and a new theory of gain and saturation in FELs. He also worked on start-up and saturation in SASE FELs. Later, he took up the challenge of technology development and built up a group that has indigenously developed a Plane-Wave Transformer linac and undulators for the CUTE-FEL project, and are working on photoinjectors for short wavelength FELs. Since 2008 he has been at the Bhabha Atomic Research Centre, where his interests are in high-current proton linear accelerators, free-electron lasers and plasma-based accelerators.

He was awarded the N.S. Sathyamurthy Young Scientist Award of the Indian Physics Association in 1996; he was elected Member of the National Academy of Sciences, Allahabad, India, in 1998; and he was awarded the Outstanding Research Investigator Award of the Science Research Council of the Department of Atomic Energy in 2005.

Selected Publications

- [1] *Bunch-length effects in the beam-beam interaction*, **S. Krishnagopal** and R. Siemann, Phys. Rev. **D 41**, 2312 (1990).
- [2] *The coherent beam-beam interaction in electron-positron colliders*, **S. Krishnagopal** and R. Siemann, Phys. Rev. Lett. **67**, 2461 (1991).
- [3] *The multi-cavity free-electron laser*, **S. Krishnagopal**, G. Rangarajan and A. M. Sessler, Optics Communications **100** (1993) 518.
- [4] *The two-colour free-electron laser*, **S. Krishnagopal** and V. Kumar, Optics Communications **119** (1995) 313.
- [5] *Luminosity-limiting coherent phenomena in electron-positron colliders*, **S. Krishnagopal**, Phys. Rev. Lett. **76**, 235 (1996).
- [6] *Gain and saturation in free-electron laser oscillators*, V. Kumar and **S. Krishnagopal**, Phys. Rev. **E 55**, 1887 (1997).
- [7] *Start-up and saturation in SASE FELs using a time-dependent analysis*, Vinit Kumar and **S. Krishnagopal**, Physics Review E **65**, 016503 (2001).
- [8] *Free-electron lasers and their applications*, **S. Krishnagopal**, V. Kumar, S. Maiti, S. S. Prabhu, S. K. Sarkar, Current Science, **87**, 1066 (2004).
- [9] *A new tuning procedure for a photocathode RF gun*, Shankar Lal, K. K. Pant and **S. Krishnagopal**, Nucl. Instr. and Meth. **A 592**, 180 (2008).
- [10] *Design, Construction and Characterization of the CUTE-FEL undulator*, V. Kumar, B. Biswas and **S. Krishnagopal**, Pramana – Journal of Physics, **71**, 1321 (2008).