

Kista Science Seminars



New Nonlinear Optical Materials for the Mid-Infrared

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Mid-infrared spectral region, previously exclusive domain of defense-related application is now widely exploited in wide range of applications ranging from sensing, biomedicine to material processing. High-energy and high power required in these applications can only be achieved by nonlinear optical frequency down-converters pumped by robust near-infrared lasers. The talk will provide a review of the state-of-the-art in this area emphasizing the importance of the advanced semiconductor growth and structuring technology for the future engineered materials with high potential for mid-infrared frequency conversion.

Mid-infrared nonlinear optical crystals have matured in the last twenty-five years from scientific curiosities into practical robust materials generating efficient laser output in the 2-12 μm spectral range. ZnGeP₂ in particular has emerged as the NLO material of choice for frequency conversion between 2 μm and 8 μm due to its high nonlinearity and low losses in this wavelength range. Recent development of the reliable growth technology for CdSiP₂ increased the wavelength range even further. Meanwhile, orientationally-patterned growth of III-V semiconductors GaAs and GaP has been successfully demonstrated resulting in nonlinear optical materials with unprecedented versatility in mid-infrared spectral range.

When: **Tuesday October 13 at 14:30**

Location: **Faculty Lounge**
Level 2, besides lift C, Electrum, Kista



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Biography:

Peter G. Schunemann



Peter G. Schunemann has been the leading researcher in the development of nonlinear optical materials for over 25 years, authoring or co-authoring nearly 250 publications and many patents in the field. He received his degrees in Materials Science and Engineering from the Massachusetts Institute of Technology in 1987. In the same year he joined Sanders a part of Lockheed Corporation, later transformed into Lockheed Martin Aerospace Electronic Systems, and further acquired by BAE Systems. He has served as principal investigator on numerous crystal growth development programs to produce novel and improved nonlinear optical crystals for mid-infrared laser applications. In the last decade his emphasis has shifted from melt growth of exotic IR crystals to hydride vapor phase growth of orientationally patterned III-V semiconductors. His work on ZnGeP_2 in particular, a critical component for the next generation mid-infrared coherent sources, earned him a Quarterly Technical Achievement Award in 1992, the Jack L. Bowers Award in 1994 (the company's highest technical award), and a Nova Award in 1995 (Lockheed Martin's highest honor for technical excellence), and the Association of Old Crows Technology Hall of Fame award in 2002. He is a Fellow of the Optical Society of America, a member of SPIE and MRS. In 2013 he was a president of AACG (American Association of Crystal Growth) and is currently serving on the AACG executive committee.

