

IEEE KITCHENER-WATERLOO

IEEE MTT-Chapter Presentation

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"Quantum Computing"

Abstract: Erbium doped glasses and semiconductors are widely used in modern technology for information transmission at 1.55 μm . All these devices are based on the ability of Rare Earth trivalent ions to form rigid structure of optical absorption bands inside the optical gap of host material. The position of bands is only slightly affected by host matrix and is related only to Rare Earth type (Er, Yb ...). The development of integrated optics requires small size light emitting devices and short length optical amplifiers.

Erbium doped hydrogenated amorphous silicon is a perspective material for creation of thin film light emitting devices. This material may be manufactured by a variety of methods, which are discussed in present talk. Embedded Er must be properly activated what is achieved by the addition of impurities, typically oxygen. Electroluminescence requires high efficiency of energy transfer from host material to embedded Er. Possible mechanisms of energy transfer are discussed. Modern results concerning the electroluminescent devices are presented.

The reduction of length of optical amplifiers requires the increase of Er concentration in host material. Chalcogenide glasses are prominent materials for this application due to their ability to dissolve large amount of Er. The results of optical and microstructure investigations of Ge-Ga-Se(S):Er glasses are presented and the problem of Er cluster formation is discussed.

Biography:

Dr.Cyril Coughia received the MSc degree from St.Petersburg State University (Russia) in 1978, and the PhD degree from A.F.Ioffe Physico-Technical Institute (St.Petersburg, Russia) in 1986. From 1978 to 1990 he was a research fellow at A.F.Ioffe Physico-Technical Institute. From 1990 to 1996, he occupied engineering positions in electronics industry in Russia. From 1996 to 2002, he is back at A.F.Ioffe Physico-Technical Institute doing research and undergraduate teaching (part-time). Since 2002, he joined Department of Electrical Engineering, University of Saskatchewan. His research interests include materials for integrated optics, light sources, optical amplifiers and planar waveguides, matrix detectors of X-ray radiation, properties of amorphous selenium used in X-ray detectors, computational modeling of transport phenomena in amorphous and nanocrystalline disordered semiconductors, solar energy conversion in amorphous thin films.



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Invited by Andrei Sazonov