



## Optically Reconfigurable RF Circuits

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Mobile and wireless communications systems have become an important part of our everyday lives. These ubiquitous technologies have a profound effect on how we live. People predict bright future to wireless technologies, but it wouldn't be possible without a hard work of thousands of scientists in the wireless innovation research arena. My Marie Curie project is investigating enabling technologies for future mobile and wireless communications systems.

The next generation of mobile and wireless communications systems will lead to a heterogeneous environment, created by integration of existing and new radio access systems. The required part in both user terminals and base stations will be a common Radio Frequency (RF) platform. Fully reconfigurable (smart) radio technology that we are moving toward, such as the Software Defined Radio (SDR) and Cognitive Radio (CR), is offering the ability to alter parameters of frequency, modulation type or output power by making changes in software instead of replacing hardware components. The new multi-mode products will be able to sense and adapt to available wireless networks and bridge between different network standards. For seamless functionality, these products will use multi-mode baseband technology to understand different protocols and multi-band radio technology to operate in different frequency bands.

The driving forces for the commercial viability of the Software Defined Radio concepts are advances in chip processing power while antenna and RF circuit technologies represent a significant barrier to progress due to established bandwidth limitations. The idea behind this research proposal is to merge photonics with reconfigurable antennas and RF front end circuits to provide the technology that can be reconfigured dynamically at very high speeds.

The applications of photonic components and techniques in the microwave devices present a huge potential for future research. The proposed technology could be easily integrated into a fully reconfigurable wireless transceiver. This new technology is capable of enabling components with dynamically program-

mable parameters to meet the demands of the Software Defined Radio. The proposed front end circuit and antenna technology has the potential to serve the population by improving wireless communication services, medical sensing technologies, military radar and surveillance systems, and a variety of other applications.