# Tunable RF Filters Based on Radially Loaded Evanescent-mode Cavity Resonators

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The rapid development in wireless communication technologies has resulted in ever-more complex RF and microwave communication systems. A promising solution to these challenges is reconfigurable wireless communication systems whose hardware parameters, such as frequency, bandwidth, power and efficiency, can be changed to make better use of the available spectrum. Tunable filters represent integral and critical components in such systems. In particular, tunable RF bandpass filters can be used for band selection, image rejection, and elimination of out-of-band emissions. Tunable bandstop filters enable dynamic rejection of interferers, thus improving the sensitivity and dynamic range of receiver systems.

This talk reviews recent development of several different tunable filter technologies. In particular, we will discuss the design, optimization and fabrication of a new type of evanescent-mode (EVA) cavity filter. In contrast to previously demonstrated EVA filters, the new design allows frequency tuning using planar surface mount components, such as solid-state and MEMS varactors. This allows for easy integration with PCB fabrication and package technologies. This new tunable filter design exhibits improved quality factor, tuning range, and power handling capability. Such widely tunable high-Q components will open up new horizons in the design and implementation of future frequency-agile RF/microwave systems.