# Abstracts

## Vector channels for smart antennas. Measurements, statistical modeling, and directional properties in outdoor environments

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In wireless communications, smart antenna systems that employ antenna arrays coupled with adaptive signal-processing techniques at the basestation improve capacity, coverage, and trunking efficiency. However, design and performance analysis of smart antenna systems strongly depend on channel propagation characteristics of signals present at the antenna array, the so-called vector channels. Here, variation of narrow-band vector channels (spatial signatures) due to a moving terminal is studied in typical suburban settings. Vector channel measurements are taken using a real-time smart antenna system with a uniform circular array at the basestation and a mobile transmitter at several locations. Two different wireless scenarios, namely, pedestrian and car mobile, are implemented to emulate the random movement of the mobile user. In each scenario, the mobile transmitter locations are chosen so that there exists line-of-sight (LOS), nonline-of-sight (NOLOS), or both LOS and NOLOS (mixed) propagation to the basestation. We find that in all cases, the Beta distribution can be used to empirically represent the spatial signature correlations and that large spatial diversity exists in NOLOS cases compared to LOS cases. Also, direction-of-arrivals mostly do not change much with movement in a suburban environment.

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