

## Peak Data Rate Enhancement Using Switched Micro-Macro Diversity in Cellular Multiple-Input-Multiple-Output Systems

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**Abstract :** With the exponential growth of cellular users, a new generation of cellular networks is needed to enhance the required peak data rates. The co-channel interference between neighboring base stations inhibits peak data rate increase. To overcome this interference, multi-cell cooperation known as coordinated multipoint transmission is proposed. Such a solution makes use of multiple-input-multiple-output (MIMO) systems under two different structures: Micro- and macro-diversity. In this paper, we study the capacity and bit error rate in cellular networks using MIMO technology. We analyse both micro- and macro-diversity schemes and develop a hybrid model that switches between macro- and micro-diversity in the case of hard handoff based on a cut-off range of signal-to-noise ratio values. We conclude that our hybrid switched micro-macro MIMO system outperforms classical MIMO systems at the cost of increased hardware and software complexity.

**Keywords :** cooperative multipoint transmission, ergodic capacity, hard handoff, macro-diversity, micro-diversity, multiple-input-multiple output systems, orthogonal frequency division multiplexing

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