



# Large-Scale Base Station Cooperation with Dynamic Cell Structuring

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Project website: <http://www.miweba.eu/>

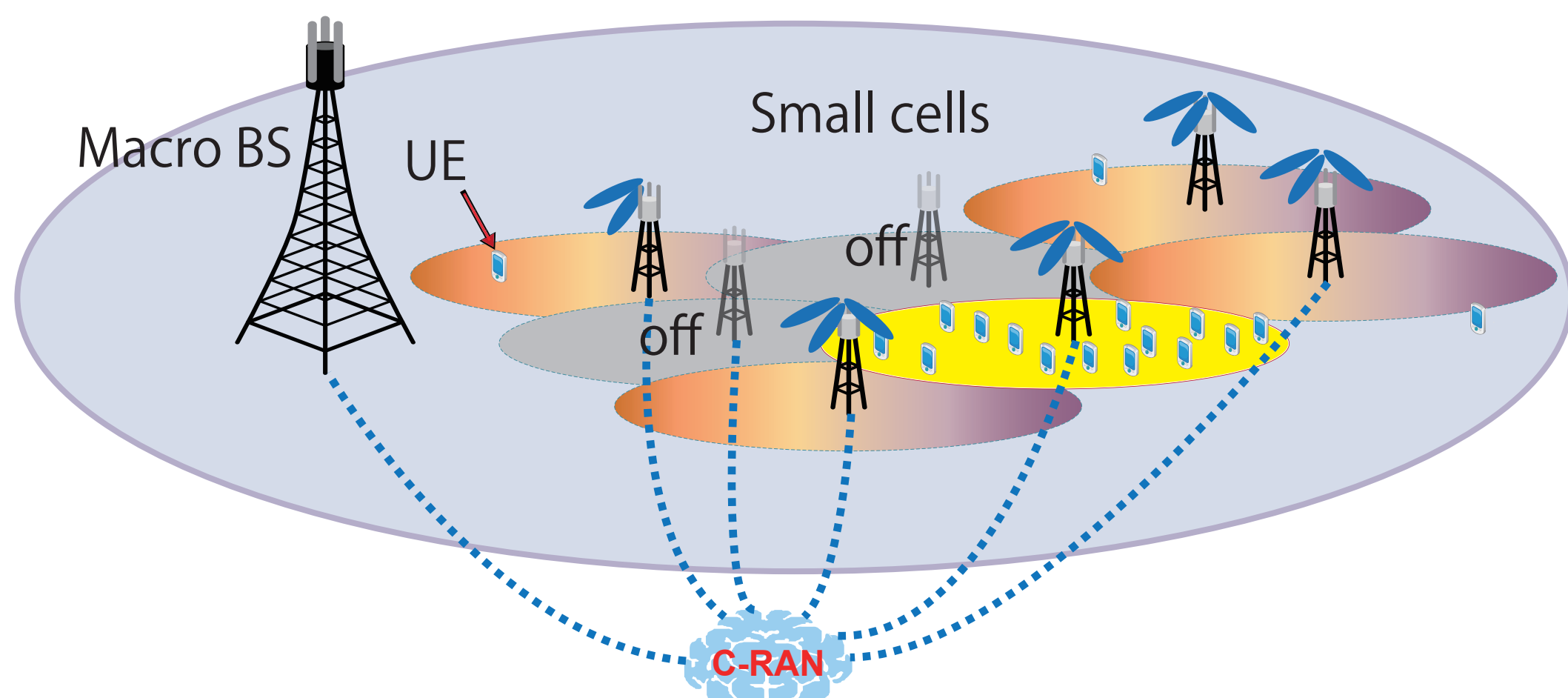
## Introduction

The users' distribution is not uniform and crowded areas appear and disappear by time during a day. The network may be designed and small cell BSs may be deployed for the most crowded time in each area. However, at any time some network resources remain unused in currently sparse areas while the crowded zones demand more resources. Several enhancements are suggested to improve the efficiency and performance of small cells.

## Key Enhancements

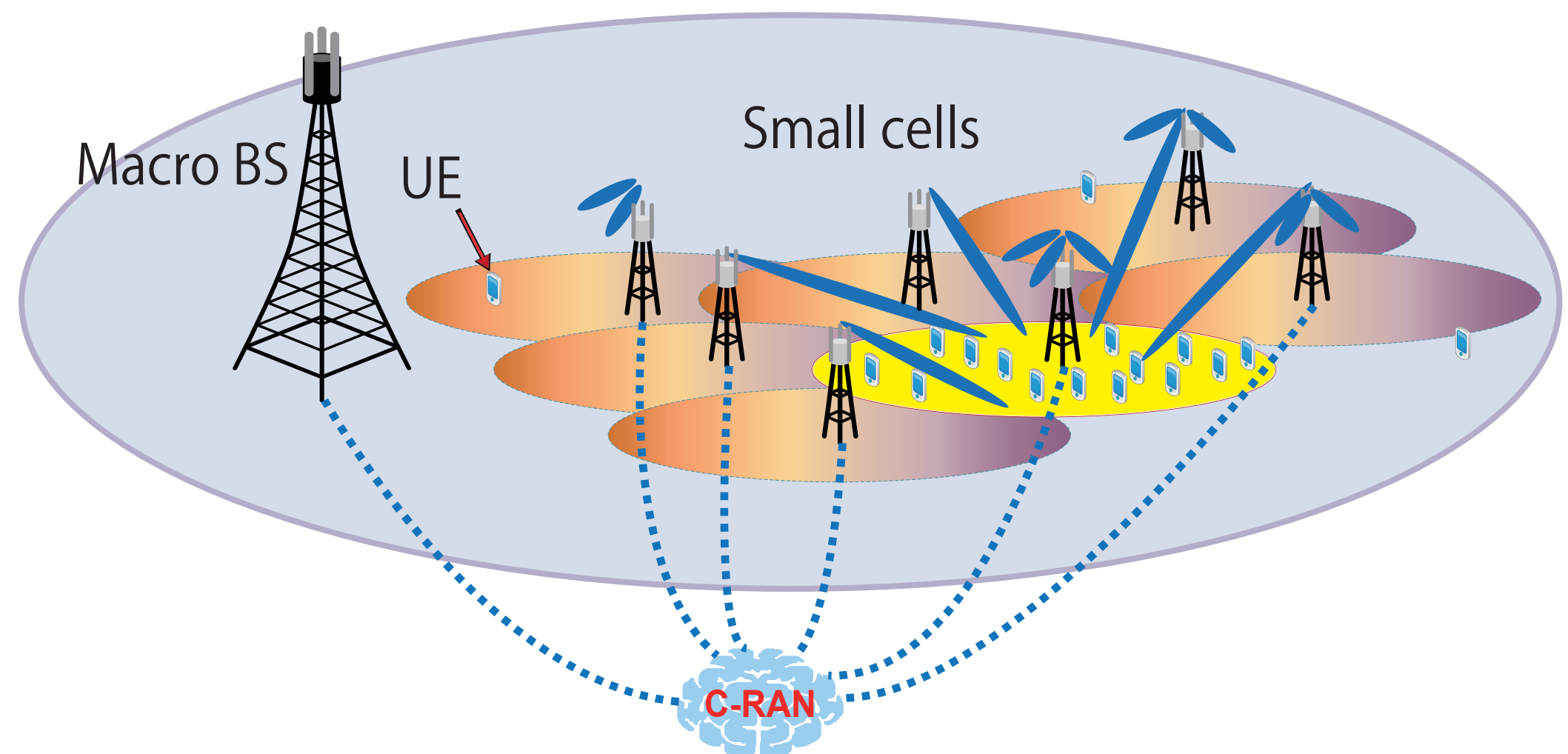
### Small cell on/off

Small cell BSs are turned on/off according to the traffic load increase/decrease, UE arrival/departure, etc.



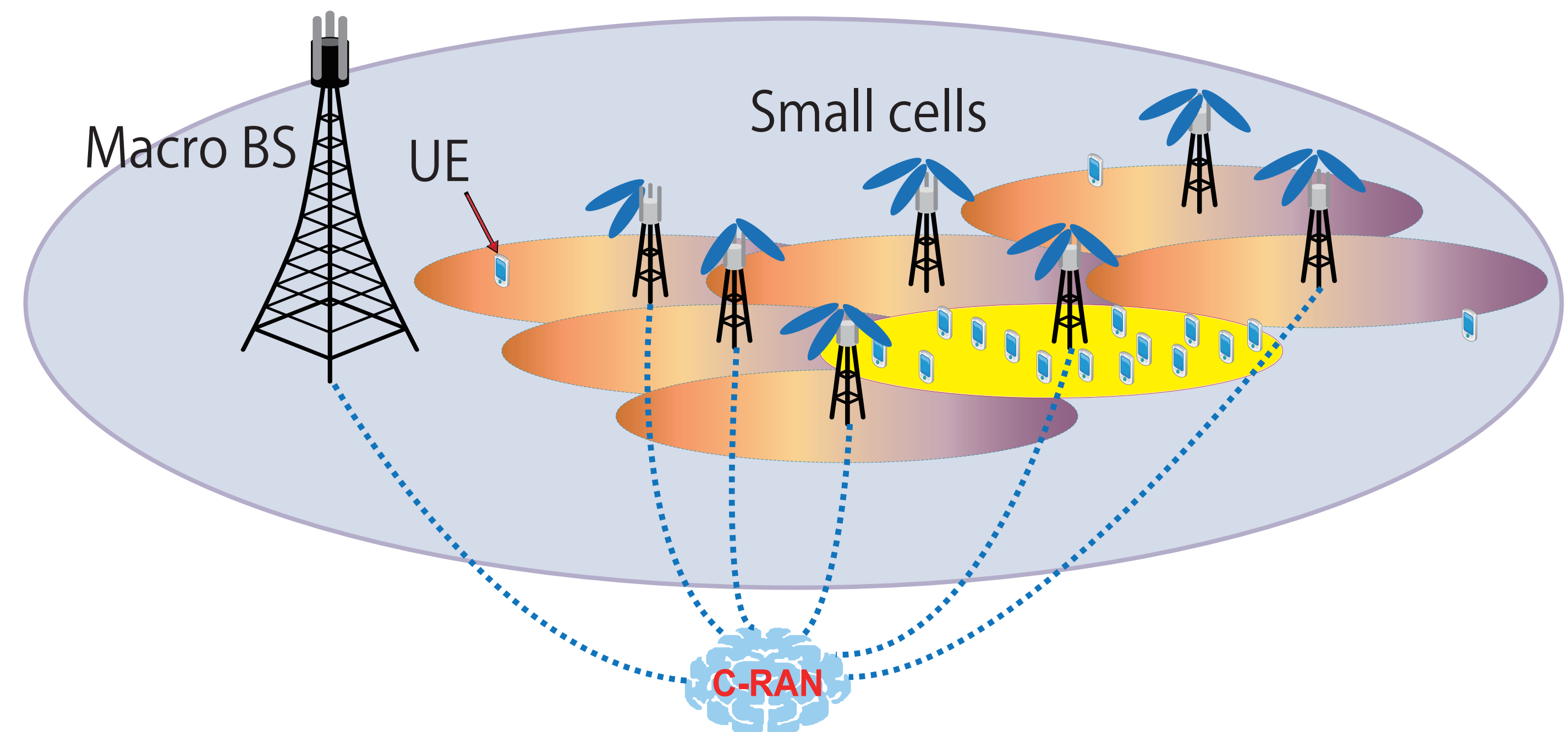
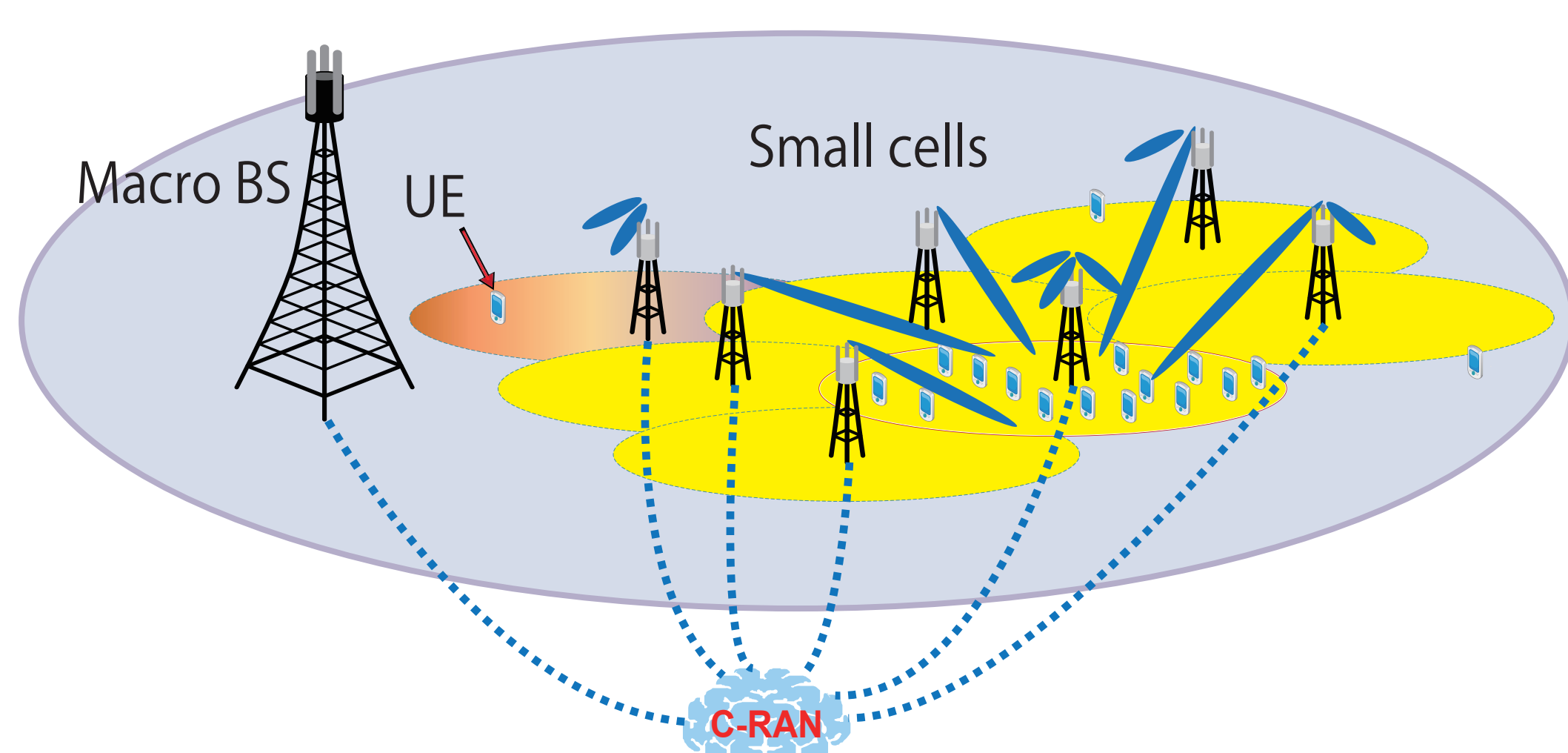
### Dynamic Coverage Control

The coverage of a BS can be shifted by changing the antenna direction in horizontal/ vertical planes.



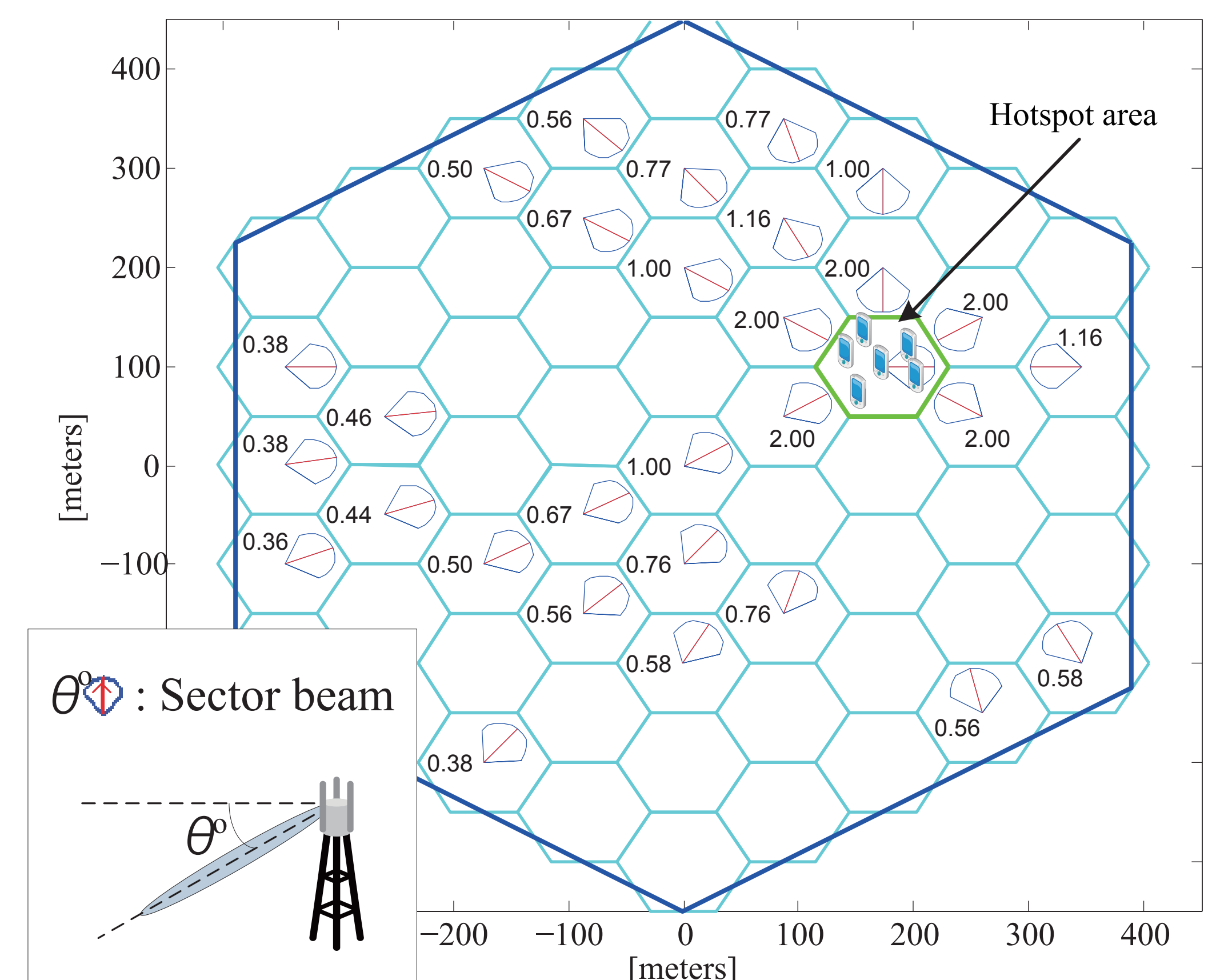
### Coordinated multipoint (CoMP)

The cooperative cluster operates as a MIMO system with distributed antennas. A large cooperative cluster along with dynamic coverage control can exploit the unused capacity of sparse areas within a crowded area (Hotspot zone).

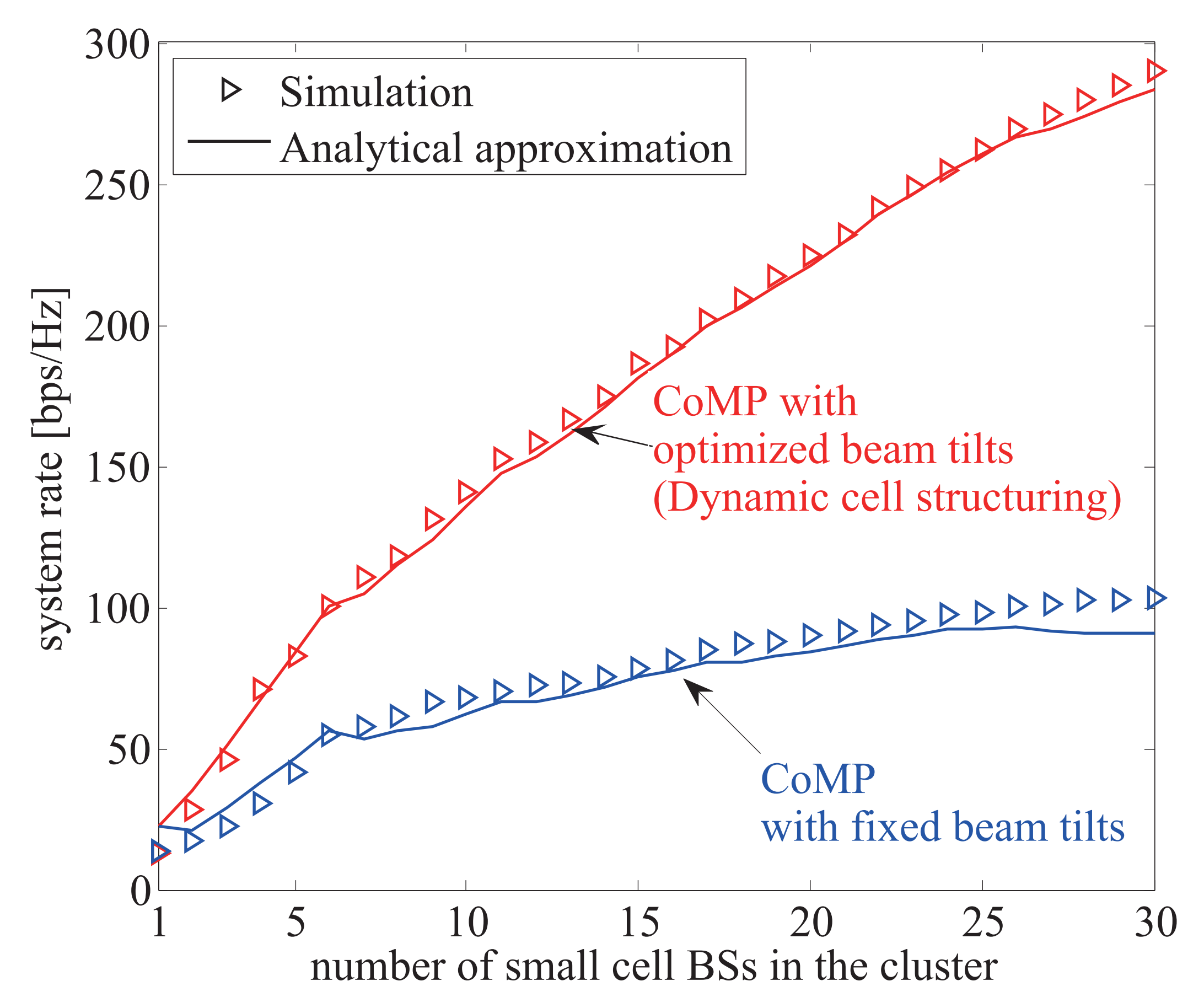


## Performance

Small cell BSs are arbitrarily placed in the macro cell area. Cooperative clusters of small cell BSs dynamically adapt to the users distribution.



Numerical evaluation was conducted for small cell BSs in 2GHz. In case of a user congestion area, CoMP is effective when it is applied along with dynamic coverage control.



Small cell Antenna height: 5m  
3dB beamwidth in horizontal plane: 70°  
3dB beamwidth in horizontal plane: 10°