

Dynamic Inter-Cell Interference Coordination and Signaling

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Purpose:

To adopt the inter-cell interference coordination (ICIC) scheme proposed herein into IEEE 802.16m system description document (SDD).

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Dynamic Inter-cell Interference Coordination (ICIC) and Signaling

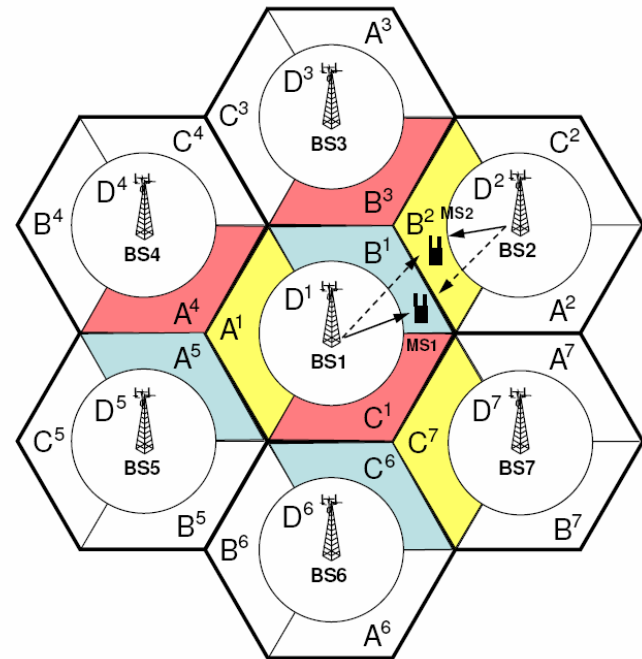
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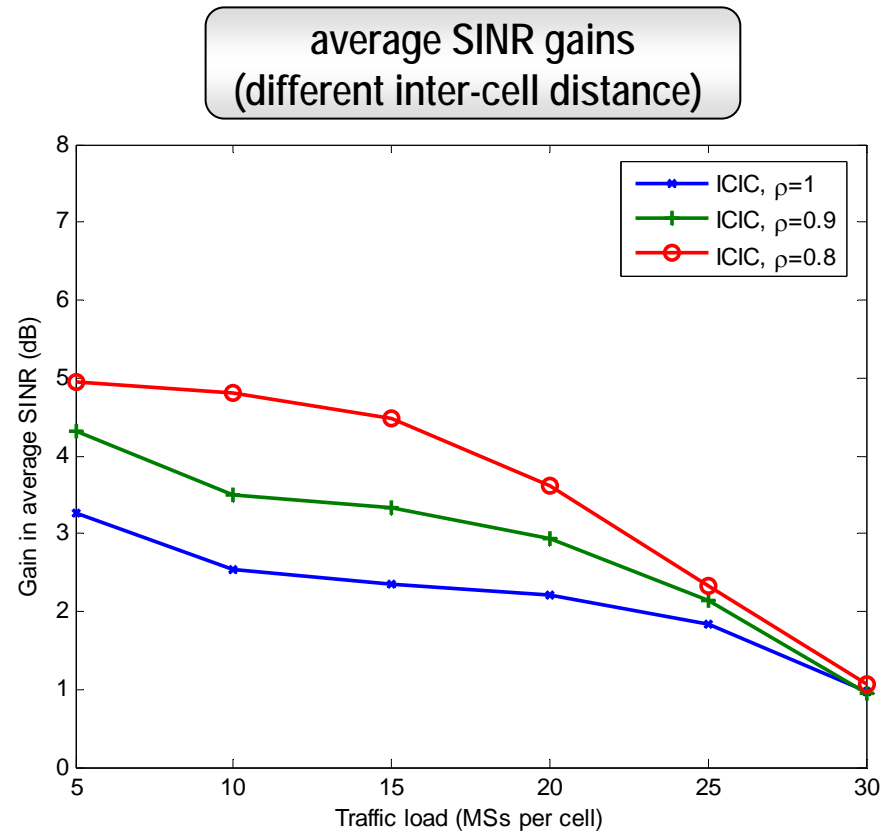
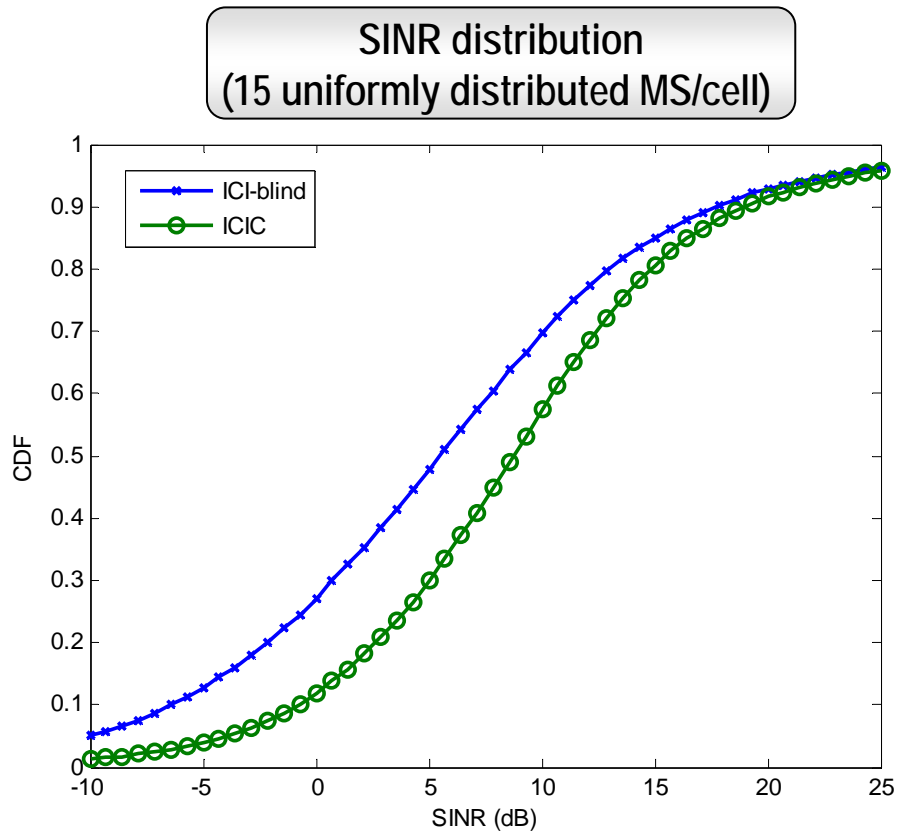
Inter-Cell Interference Coordination

- Inter-cell interference (ICI) is a performance limiting issue for cell-edge users.
- ICI coordination (ICIC) technique can effectively reduce ICI in cell-edge regions
 - Let neighboring BSs coordinate among themselves and allocate disjoint channel resources to those MSs who otherwise will experience severe interference.
- Two approaches
 - Fixed approach
 - Dynamic approach
- Changes needed
 - Over the air
 - Interference measurement
 - Reporting
 - ...
 - Via the backbone
 - Interference information exchange
 - Resource allocation information exchange
 - ...



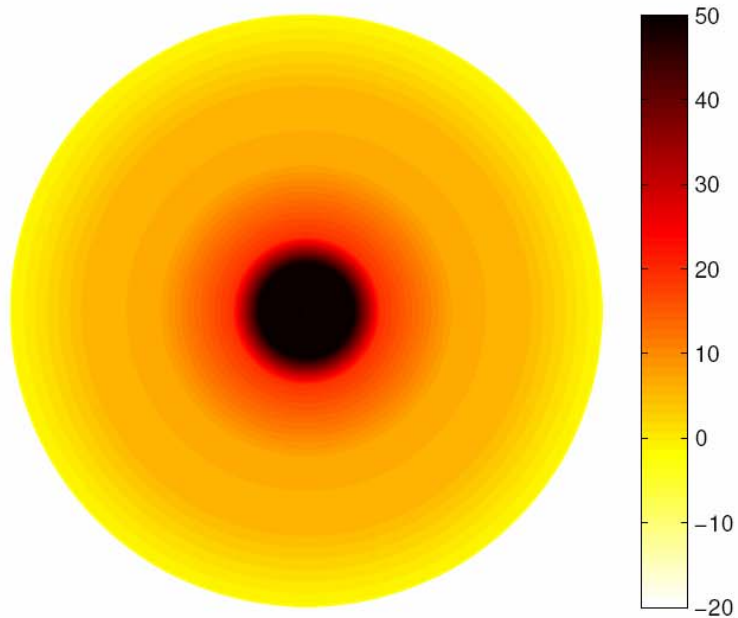
Performance Gains

- ICIC can significantly improve the SINR performance.
 - Especially at light and medium load

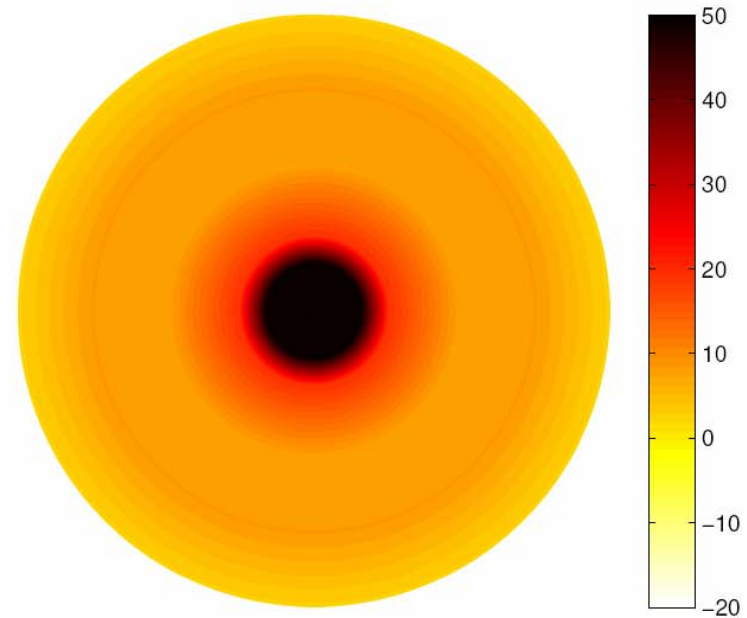


Performance Gains

- ICIC can significantly improve the SINR performance.



(a) ICI-blind

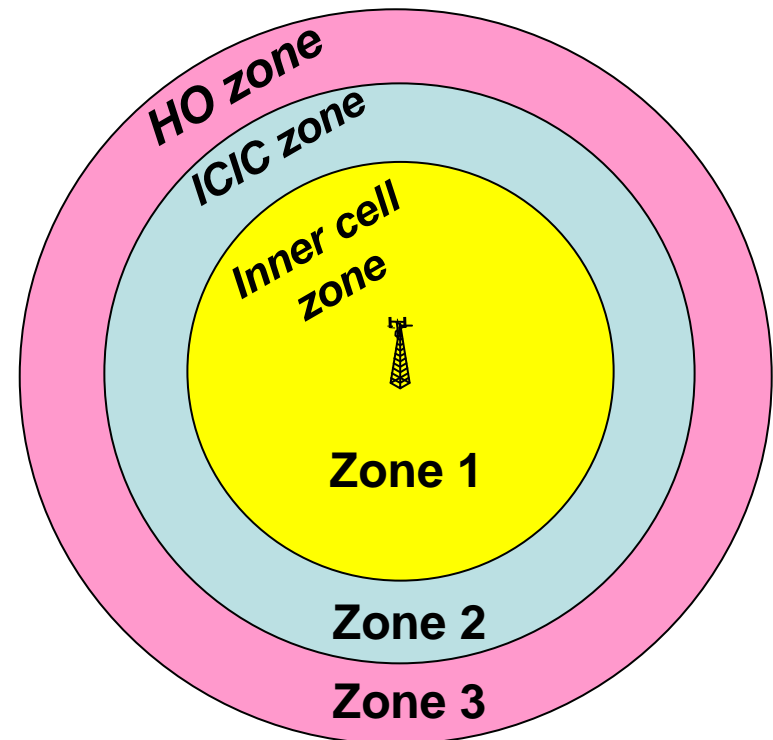


(b) ICIC

Standardized Mechanism to Support ICIC

- MOB_MSHO-REQ approach

- Zone 3:
 - MS use MOB_MSHO-REQ message to inform its serving BS of its neighboring BSs information (e.g., BS ID, CINR/RSSI).
 - If MDHO/FBSS is supported, additional information about BSs in the *Diversity Set* (BS ID, CINR/RSSI) will also be communicated from the MS to the BS.
- Zone 2:
 - The MOB_MSHO-REQ message is used to request ICIC reporting.
 - In this case, the BS does not need to reply with a MOB_BSHO-RSP message.



- MOB_SCN-REP approach

- The MS in any cell zone can use MOB_SCN-REP message to inform its serving BS of the neighboring BSs (e.g., BS ID, CINR/RSSI, etc.).
- If MDHO/FBSS is supported, additional information about BSs in the Diversity Set (e.g., BS ID, CINR/RSSI) will also be communicated from the MS to the BS.

Conclusions

- Inter-cell interference (ICI) is a very important issue to address in OFDMA network.
- Inter-cell interference coordination (ICIC) can achieve significant performance improvement.
- Only minor change to the IEEE 802.16 Rev2 air interface would be needed to enable the ICIC function.