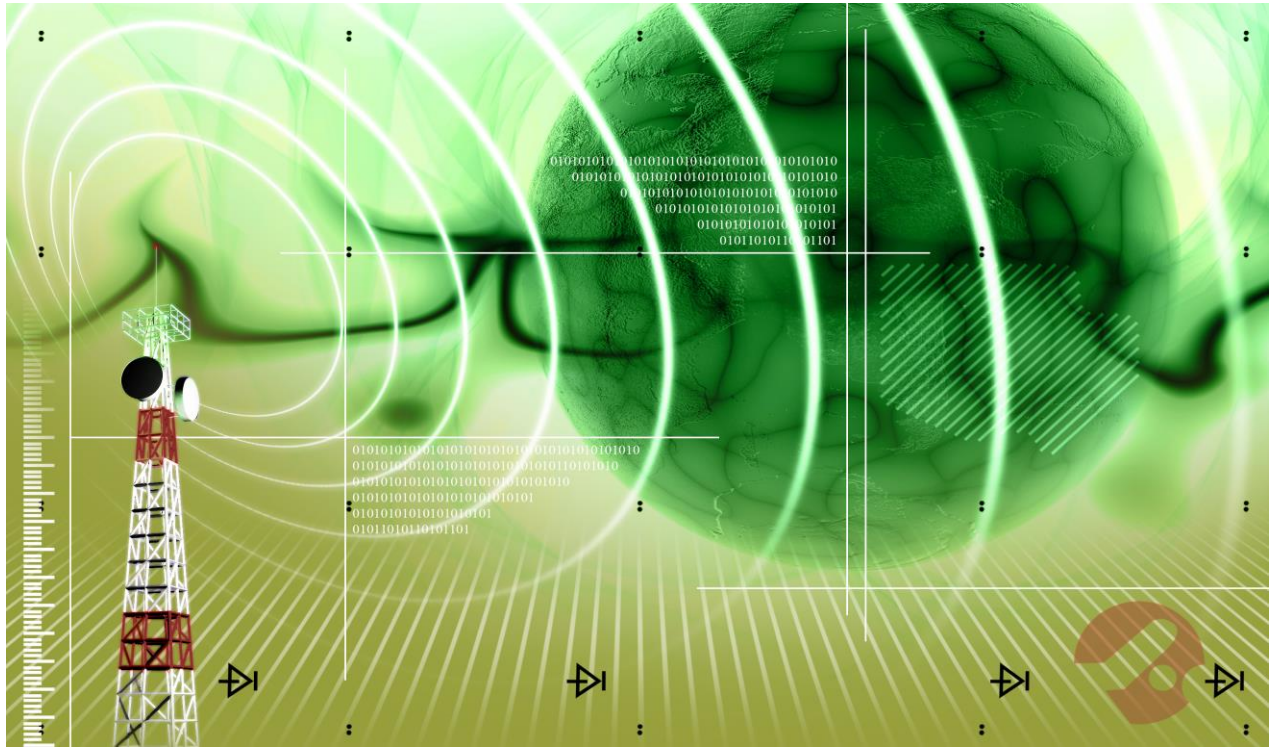
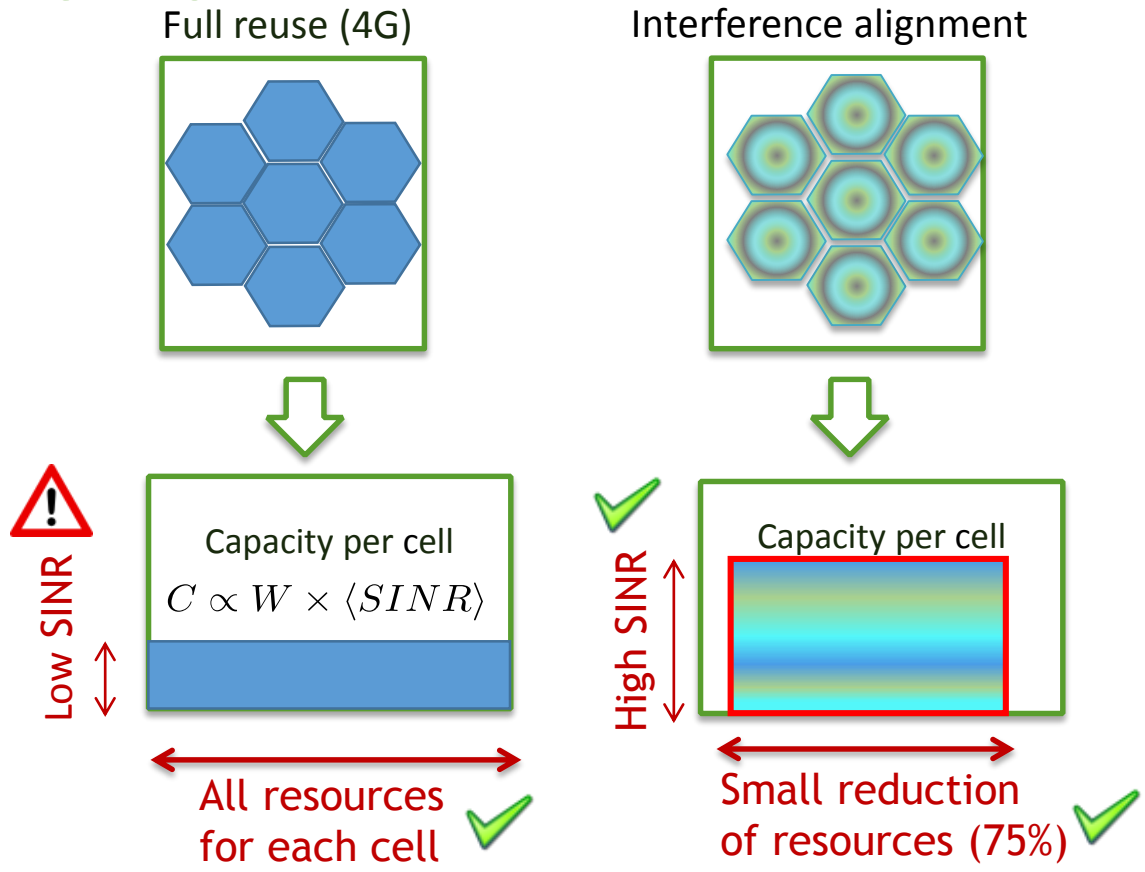
Interference Alignment in Cellular Networks



Interference Alignment for Energy Efficiency Improvement

CHALLENGE AND BREAKTHROUGHS

- The energy efficiency - spectral efficiency (EE-SE) tradeoff in 4G networks with full reuse is interference limited.
- Edge-cell mobiles suffer the most from interference.
- Objective of interference alignment is to increase the capacity per cell through interference reduction with a limited resource restriction per cell.

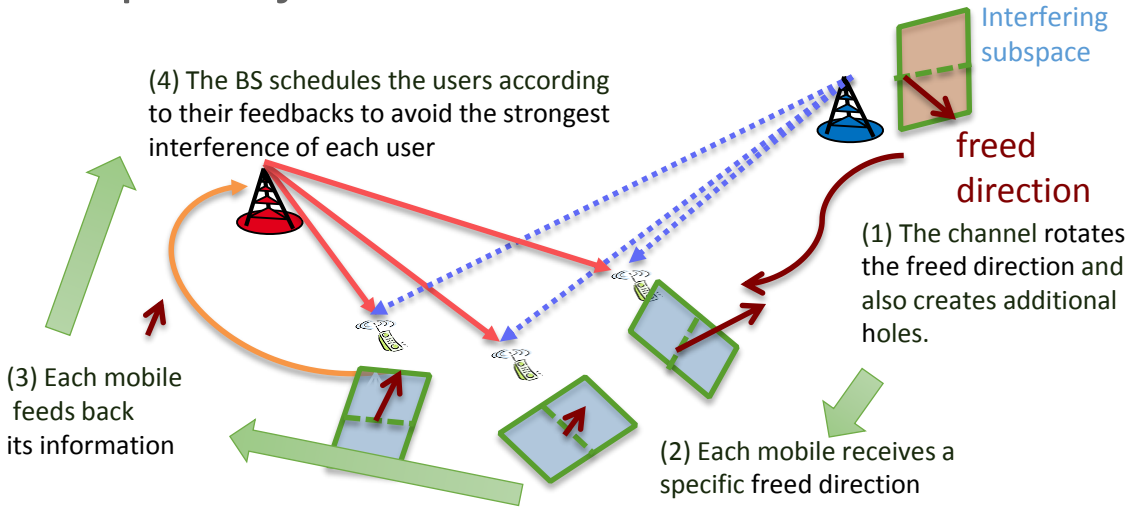


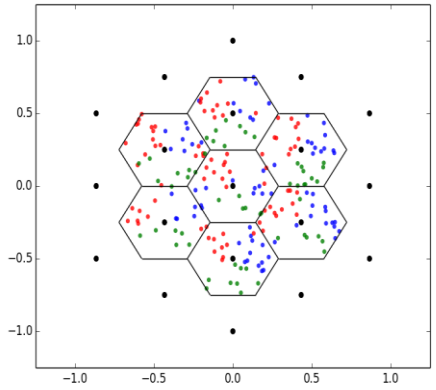
Minimize Interference and Maximize Resource Utilization per Base Station for Improved System Efficiency

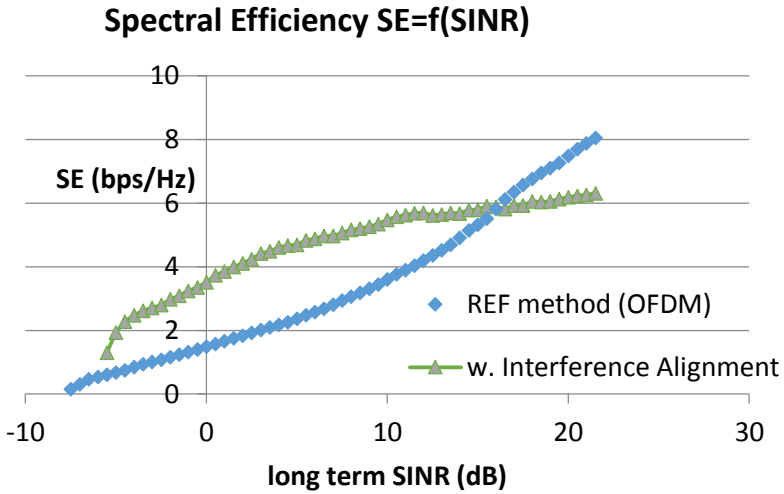
Interference Alignment

KEY ACCOMPLISHMENT AND RESULTS

- Designed a 2x2 MIMO / dual frequencies scheme with limited feedback
- Developed a joint scheduler-resource selection algorithm





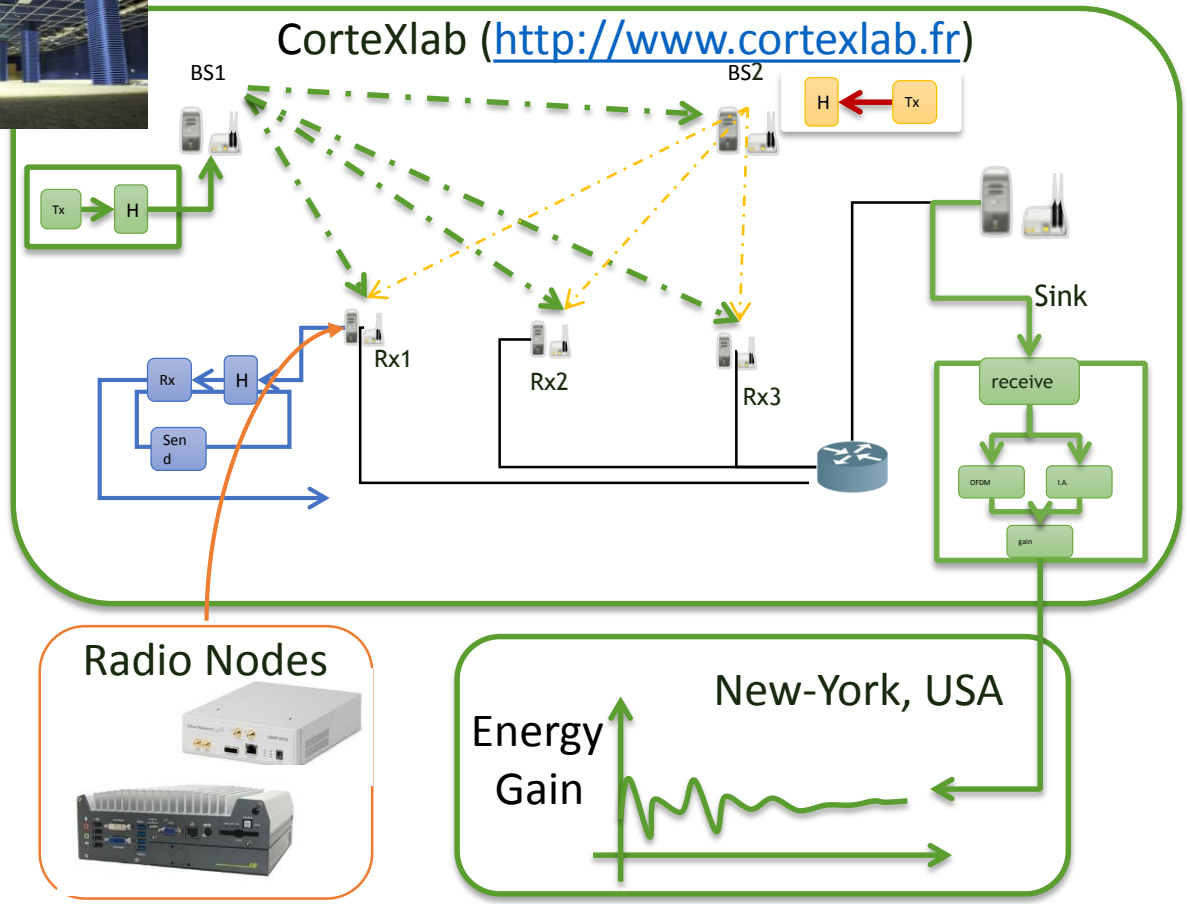


Increases the Cell Capacity by a Factor 2 and Reduces Energy Consumption at the Network Level by 15%

Interference Alignment

DEMO DESCRIPTION

- Highlights the most important technical point : channel estimation and diversity gain
- IA technique is evaluated in new shielded facility in CorteXlab in Lyon, France
- Two BSs and 3 mobile nodes are emulated remotely
- Algorithms and channel conditions are tunable



FIT-CorteXlab is a Remotely Accessible Facility Allowing to Test Multi-User Communication Algorithms and Technologies