

# Asynchronous Waveforms for 5G air interface

Conservatoire National des Arts et Métiers (CNAM),  
Paris, France

contact : [didier.le\\_ruyet@cnam.fr](mailto:didier.le_ruyet@cnam.fr)

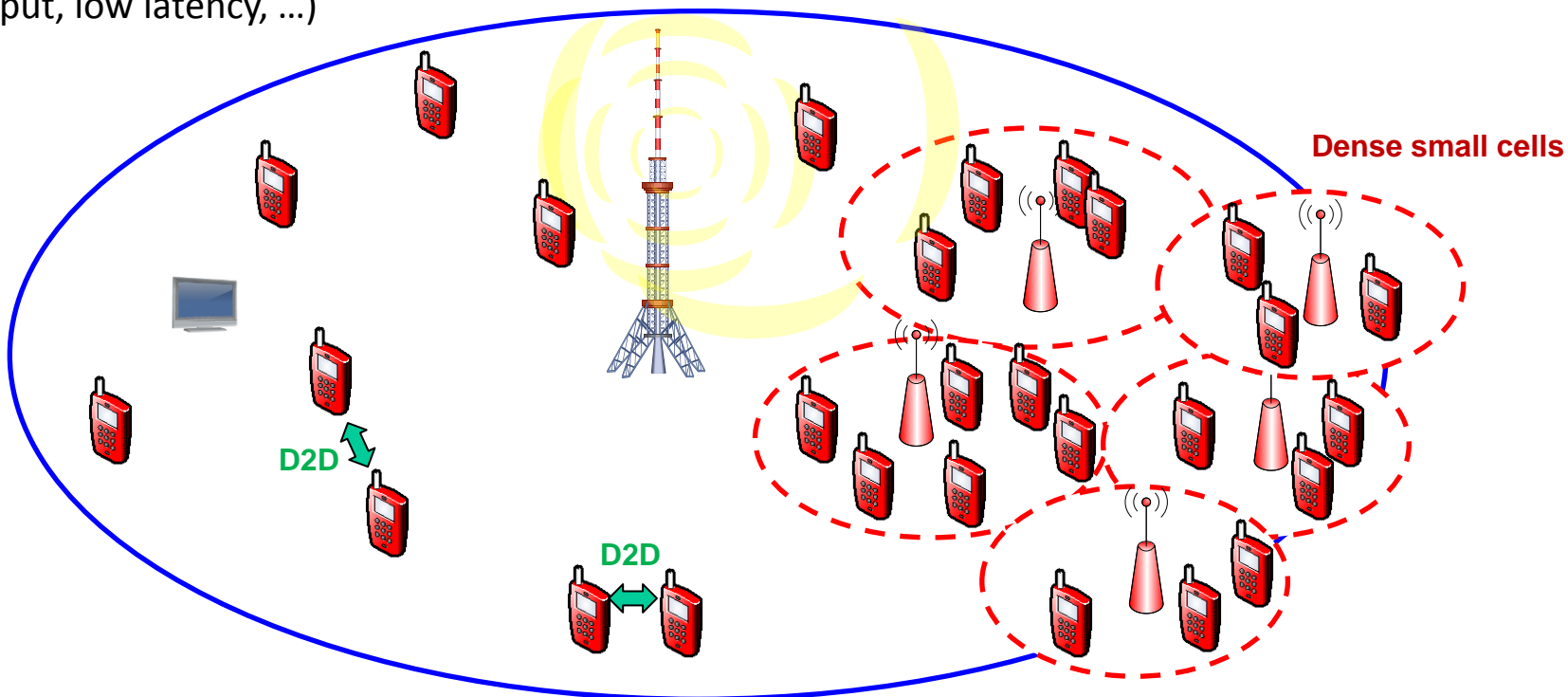
# Our vision of 5G air interface

## Asynchronous waveforms :

- relax the constraints of perfect synchronization required when using orthogonal (OFDM) waveforms/ reduce signalisation

- allow to cope with the different requirements of 5G systems based on Heterogeneous Network architectures (high number of small cells, D2D communications, massive machine communications, ...)

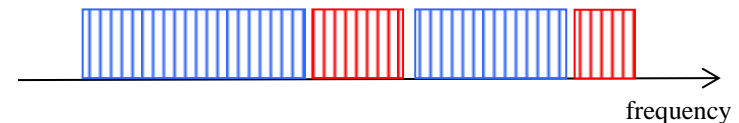
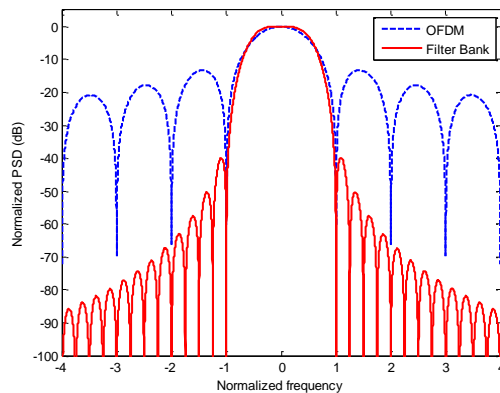
- enable to support the different applications of 5G (Internet of Things, high data throughput, low latency, ...)



# Our vision of 5G air interface

## Key technology : Filter bank based multi-carrier (FBMC) communication with well frequency localized waveform

- eliminates the guard bands between the different systems
- no cyclic prefix
- facilitates simultaneous transmission and reception (in-band FDD, full duplex)
- simplifies carrier aggregation



# CNAM expertise

**CEDRIC/LAETITIA research team : 10 professors+assistant professors involved in research on filter bank based communication**

**Other research expertise :**

- **Multi-user MIMO/relay/CoMP schemes**
- **Space time codes**
- **Ressource allocation algorithms**
- **Signal Processing for wireless communication**
- **RF aspects and DSP processing**

**Past/current experiences :**

- **Leader of PHYDYAS STREP Project (2008-2010) on Physical Layer for Dynamic Spectrum Access and Cognitive Radio**
  - **First European project to focus on FBMC**
- **Partner of EMPHATIC STREP Project (2012-2015) on Enhanced Multicarrier Techniques for Professional Ad-Hoc and Cell-Based Communications**