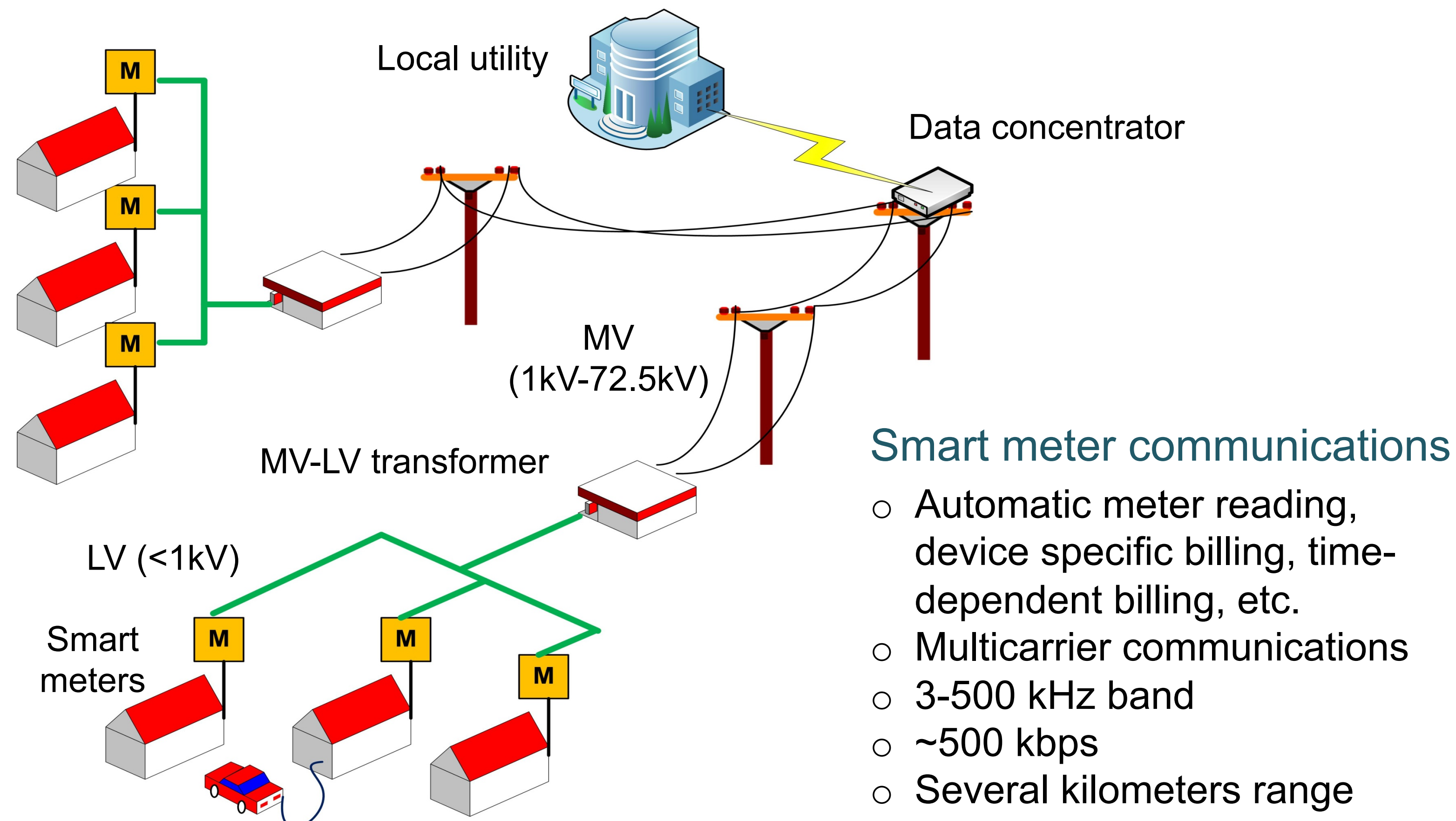


Impulsive Noise Mitigation in Powerline Communications

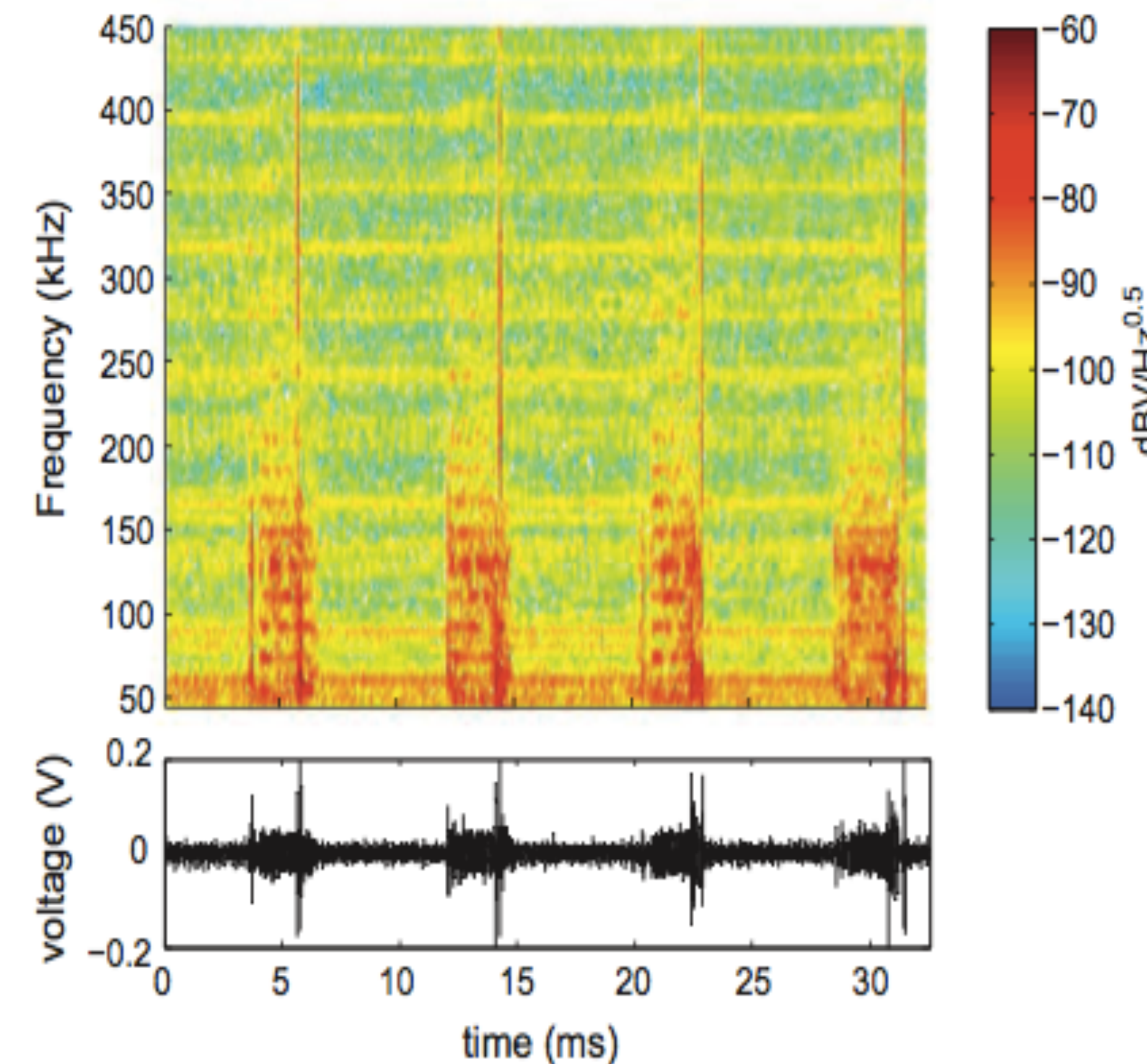
Jing Lin, Marcel Nassar, Karl F. Nieman and Brian L. Evans, The University of Texas at Austin
 Project supported by National Instruments, and by SRC GRC under Task Id 1836.063.

Objective: Estimate and mitigate non-Gaussian interference to enable energy-efficient and reliable powerline communications

Local Utility Powerline Communications



Cyclostationary Impulsive Noise in PLC

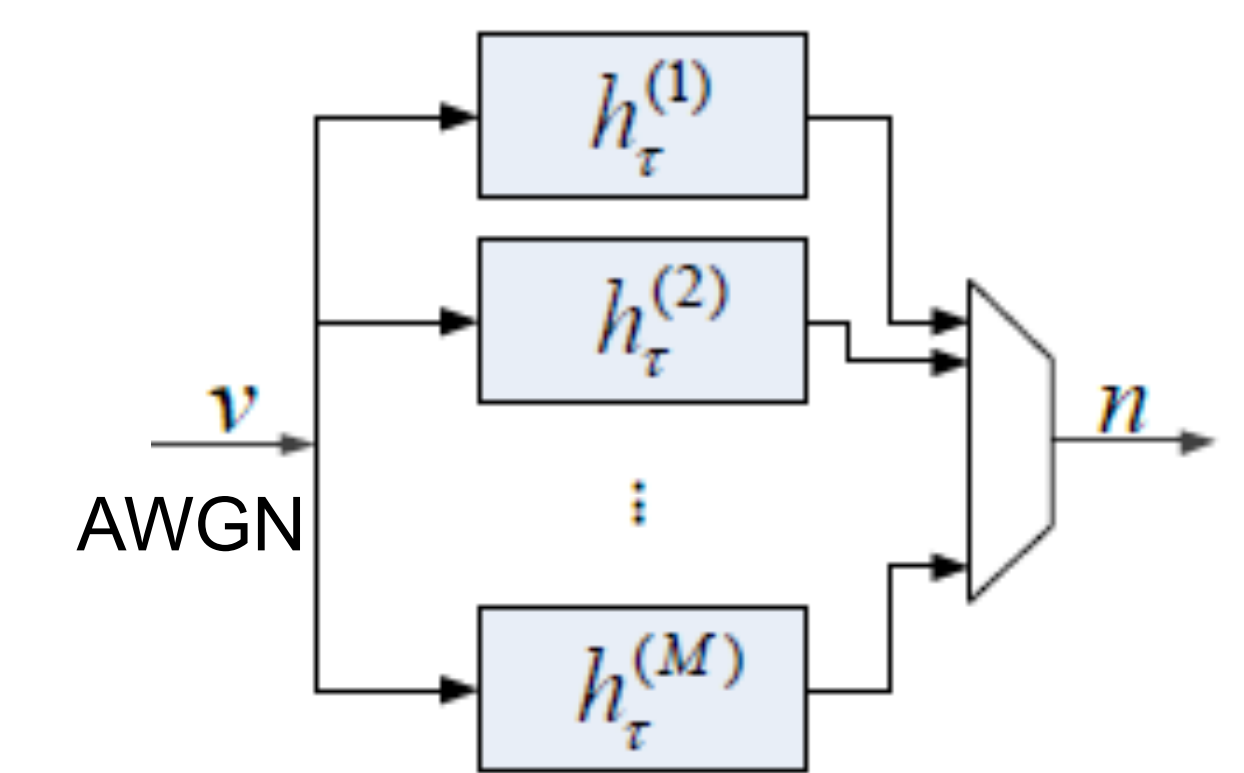


Caused by

- Switching mode power supplies
- Broadcast stations

Modeled by

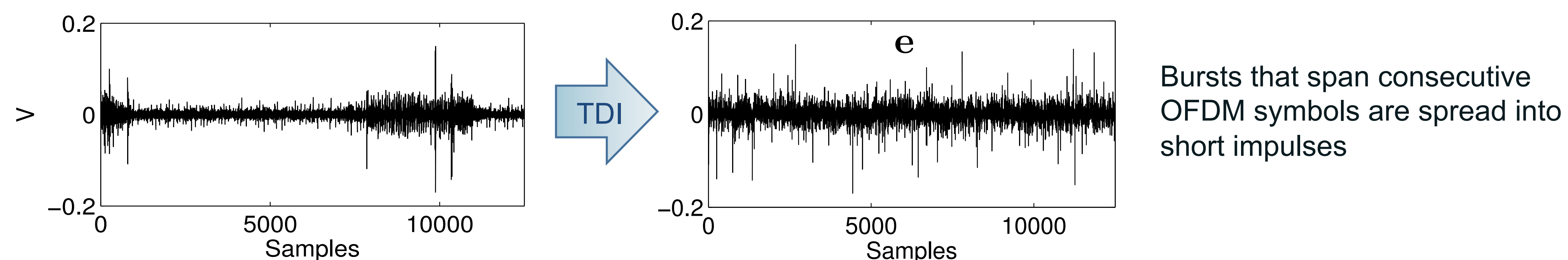
- Linear periodically varying system



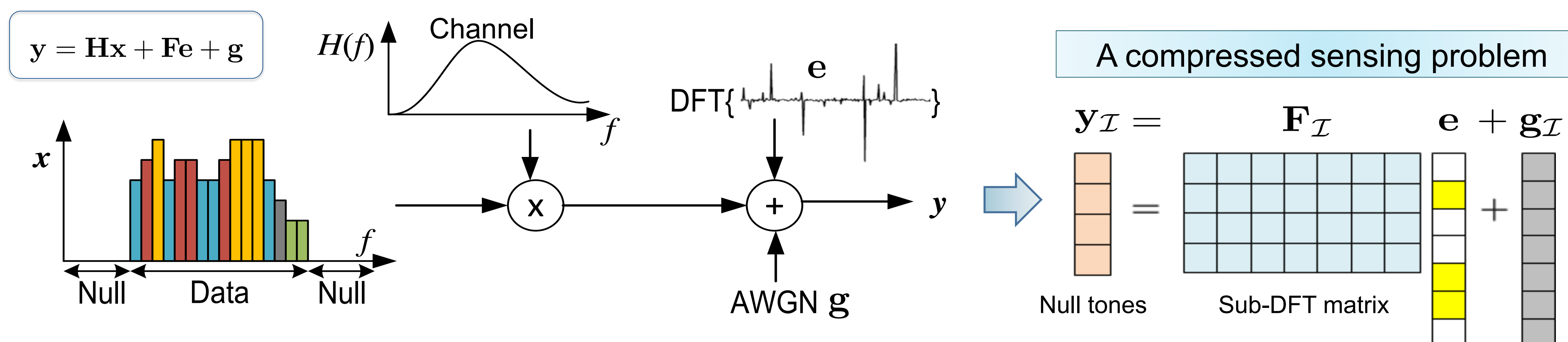
Adopted in IEEE P1901.2 narrowband PLC standard

Impulsive Noise Mitigation

❖ Time-domain block interleaved (TDI) OFDM



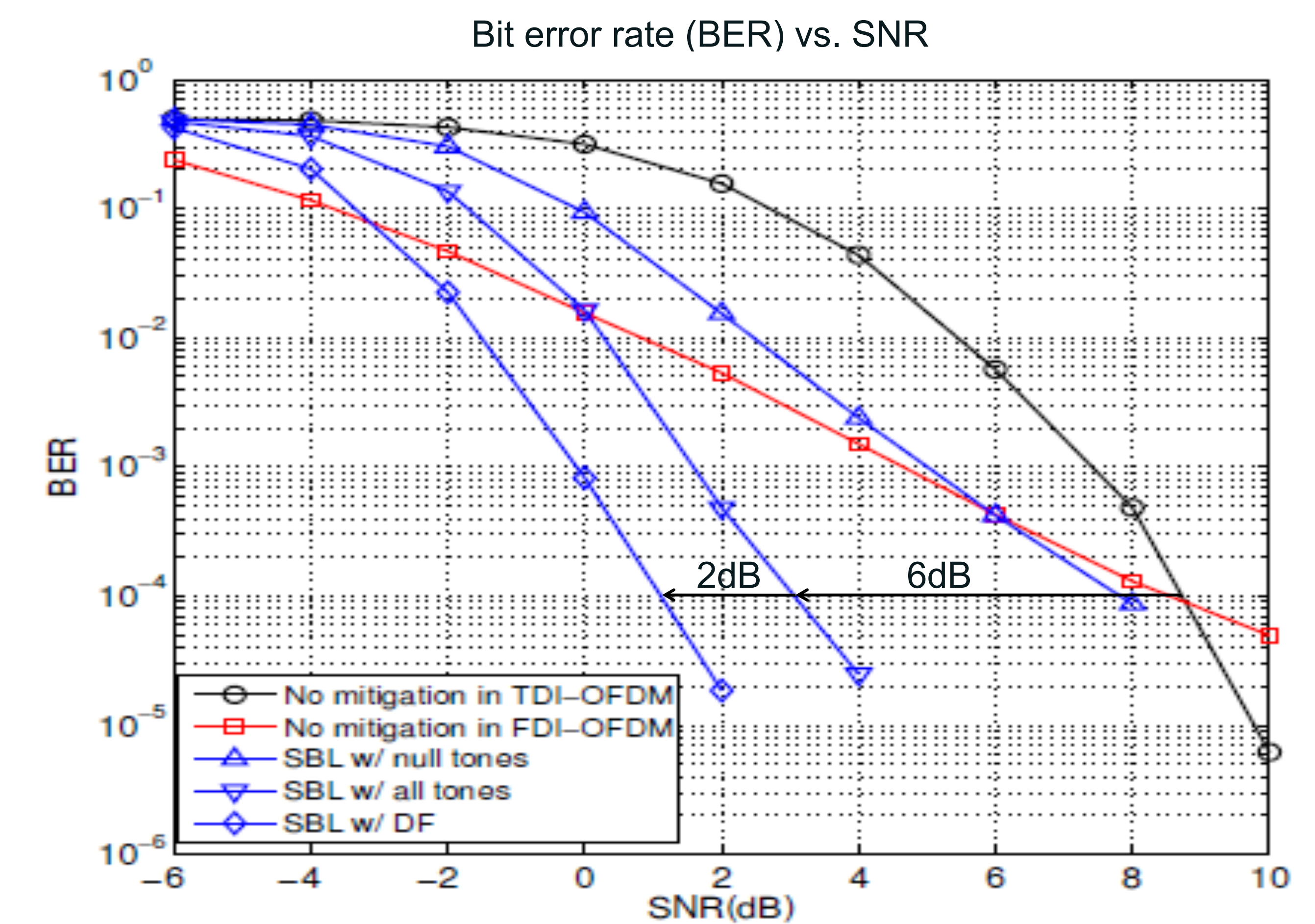
❖ Non-parametric noise estimation by Sparse Bayesian Learning (SBL)



- Three iterative algorithms to estimate e from (1) received null tones, (2) data tones, and (3) decision feedbacks
- Non-parametric approach: no noise model assumptions, no training overhead, robust to variation of statistics

❖ Subtract noise estimate from received signal

Simulated Performance



FDI: frequency-domain interleaved; DF: decision feedback