



UNIMORE
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Vehicular Connectivity in 5G and Beyond

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Abstract According to the World Health Organization (WHO), 1.3 million people die every year as a result of road traffic accidents caused by human errors. While more severe traffic regulations and a safer road infrastructure design would substantially reduce the number of casualties, Vehicle-to- Everything (V2X) communications will play a crucial role in improving road safety and transportation efficiency. To this end, 3GPP recently introduced the 5G V2X cellular technology, known as New Radio (NR)-V2X, in Release 16 specifications. Designed to support both basic safety-related applications and enhanced V2X use cases in out-of-coverage scenarios, where vehicles directly communicate without the support of the cellular infrastructure, the NR-V2X technology is characterized by a new physical (PHY) layer design and new Medium Access Control (MAC) features expected to guarantee improved robustness and flexibility. This seminar will illustrate the most relevant PHY and MAC layer aspects that influence the NR-V2X operation, delving into the impact that the different types of data traffic generated by V2X-enabled Connected and Automated Mobility (CAM) applications have on system performance. The seminar will also elaborate on the potential of AI-based distributed scheduling algorithms for the allocation of aperiodic traffic and the support of CAM in the context of 5G and beyond V2X communications.