

EEI-KOLLOQUIUM

Lattice Coding for Communications and Security: Past, Present, and Future

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Cauerstraße 7/9, Hörsaal H15

Diskussionsleitung: Prof. Dr.-Ing. R. Schober

This talk starts with an overview of the basics of lattices and their classical applications to the constructions of bandwidth-efficient coding schemes for Gaussian, fading and MIMO channels, as well as the associated lattice/sphere decoding algorithms. Then, a new lattice parameter -- the flatness factor is introduced, and its significance in several problems of communications, including network coding and physical-layer security is demonstrated. The latter has led to the first class of codes in the continuous wiretap channel featuring semantic security, the standard notion of security in cryptography. In the end, a multitude of emerging applications of lattice codes in multi-terminal communications and network information theory is outlined.