

KOLLOQUIUM

Informatik-Sonderkolloquium

Packet-Based Power Transmission

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The Quantum Grid is a packet-based energy distribution grid operating under a novel fundamental principle: power flow from a source to a destination is realized by the transmission of energy-packets and is only possible by a contract for energy-packet delivery. Each consumer needs to order energy-packets with the required power profile in order to cover his specific needs.

Just as the Internet, the Quantum Grid will have a self-similar structure, is self-organized and operates decentralized. This implies inherent fail-safety.

The new grid concept is particular suited for 100 % integration of renewable energies. Consumers are becoming producers (prosumers). Traditional roles break up and the centrally organized supply and control of today's grid seems no longer adequate.

The core element of a packet-based energy-grid is the Quantum Grid Router, enabling the transmission of energy-packets from a sender, through the grid to a receiver. An energy-packet is defined by a unique data-packet containing the full information of the energy packet. The power flow transmission in the Quantum Grid is accomplished by the routing of energy packets, allowing the simultaneous transmission of multiple energy-packets along the same link.

Also storage devices will be an intrinsic part of the grid, where energy-packets can be stored and later retrieved.

Only an electricity grid as the Quantum Grid will be able to meet the requirements of the digital world in the future and thus:

$$\lim_{(t \rightarrow \infty)} \text{Smart Grid} = \text{Quantum Grid}$$

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