

**Hermes Partnership workshop on
Nano Communication and Technology for Autonomous, Ultra Miniature, Ultra Low Power,
Multi-Functional Wireless Systems**

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**Abstract of presentation of Lars-Erik Wernersson,
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Title: 60 GHz Impulse Radio

60 GHz radio communication is currently being developed with the aim to increase the bit-rates in the data transfer. CMOS technology is capable in providing the hardware required and conventional modulations schemes may be applied. On the other hand, the power consumption in the transceivers may still be high and it is attractive to consider alternative solutions and to evaluate the prospects of emerging nanodevices. We have developed a 60 GHz pulse generator implemented with a single nanotransistor and a passive network and used it to create pulses down to 30 ps with a time jitter of 1.3 ps and a power consumption of 1.3 pJ during the pulse generation. Tuning of the bias conditions allows for bi-phase pulse generation and frequency modulation enabling higher order modulation schemes to be implemented. The transmitters are initially evaluated in a test-bench and pulses are transmitted over an air interface at a bit-rate of 2.5 Gbps with a BER below 10⁻¹² over a distance of 0.3 m using a OOK modulation. This technology is inherently scalable and is expected to operate in the frequency range up to 300 GHz.