

TUNAMOS project uses magnetic nano-oscillator to solve limitations of integrated oscillators in wireless devices

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The project "TUnable NAno-Magnetic OScillators for integrated transceiver applications" aims at demonstrating the breakthrough concept spin torque in a nano-scale microwave integrated oscillator for application in wireless integrated devices. The project is part of the FP6 program of the EU and is being coordinated by IMEC.

The recent discovery of the spin torque oscillator, a nano-patterned ferromagnetic device in which high-quality tunable microwave oscillations can be generated by a small DC current, opens perspectives to solve the paradigms in microwave engineering design. None of the RF oscillators existing today combines a high-quality resonance with a high integration level, necessary for low-power and low-cost applications, and wideband tunability.

The frequency of the oscillation generated by the spin torque oscillator can be tuned by a magnetic field as well as by the current in a range of 5-40GHz. Quality factors as high as 18000 have been observed, making the magnetic flute a natural current-controlled RF source. This electronic device is extremely suitable for integration because of the nano-scale dimensions (diameter of the contact

The TUNAMOS project aims to study the oscillating modes in the range of 5-10 GHz as well as the influence of parameters (e.g. temperature, geometry,...) on the microwave frequency, signal power and phase noise.

Monolithic integration with a high-gain RF CMOS amplifier circuit will boost the power to levels suitable for wireless applications.

This oscillator has the potential of bringing closer the vision of integrating flexible and agile low-cost radio capability into every silicon product of the intelligent environment of tomorrow.

Other partners in the TUNAMOS-project are STMicroelectronics, UPS Université Paris Sud and UFSD University of Sheffield. The project was launched on 1st of June 2005 for a duration of 3 years.

Source: IMEC

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