



Noise in Physical Systems Laboratory

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NANOPOWER - Innovative energy from the nanoworld

Where will we get the power for all the innovative information and communication technologies from? Mainly in situ, that is from the ambient where the piece of technology operates, abundant but available in disordered forms such as small vibrations of objects, temperature differences, random movement of molecules.

The ability to use these free sources of energies relies on the understanding of energy transformation processes at nano-scale and on wise technological solutions that will convert this energies into electricity to power small and ubiquitous electronic devices.

Most of the innovative technological solutions on display at the Innovation Convention 2011 organised by the European Commission in Bruxelles on the 5th and the 6th of December are based on micro sensors that monitor physical parameters useful for human and animal health control that can be implanted or worn for health care, on powerful computer as small as shirt buttons used for ambient intelligence or sensors distributed in the natural environment to monitor its condition. At the moment all these ICT devices are powered with batteries but the research carried out by the Nanopower project on display at the Bruxelles convention (booth 22) and directed by the NiPS Laboratory at the Physics Department of the University of Perugia – Italy, shows a step forward.

Nanopower is a project supported by the EC within the 7th framework programme (FET Future and Emerging Technologies programme) that focuses on energy harvesting science and technology at micro and nano-scale. The project involves 6 partners from 5 European countries who are developing techniques to power all these devices with ambient energy and the state of the art of this research is shown through interactive exhibits presented in Bruxelles. Among these: *The intelligent car*, an example of energy harvesting for smart automotive systems based on HAT (Hybrid Autonomous Transceiver) jointly developed with the Perugia University spinoff Wisepower s.r.l.. The *Nano springboards* that consists of nano-devices called cantilevers who convert micro vibrations into electricity. The *Light the flag* where visitors press floor tiles converting their movement into electric signals to light a 600 LEDs Italian flag.



“We are quite confident – stresses Prof. Luca Gammaitoni coordinator of the Nanopower project, that in five years from now the prototypes on display in Bruxelles will be developed in sub millimetre electric power generators that will be commercially available for embedding in implantable sensors”. Following this trend in 10 years from now the advances in energy management at nanoscale will make possible the realization of nanoscale ICT, breaking the current limits in present technology. The research funded by the FET (Future and Emerging Technology) of the EC is of paramount importance in seeding this development activity. NANOPOWER project is only one example of a wider strategy that goes under the name of “Toward-Zero-Power” ICT aimed at these very purposes.

More information available at: www.nanopwr.eu, www.zero-power.eu. Follow us on Twitter; @Nanopower1.