



Researchers from the Universitat Politècnica de València develop a pioneering device that reduces the cost and power consumption of telecommunications systems

- This breakthrough was published in the *Optics Express* journal, in last August's issue.

Researchers from the Universitat Politècnica de València's ITEAM Institute have developed the first broadband radio frequency (RF) photonic phase shifter which is tunable and based on a single semiconductor element. This means that producing it will be cheaper, and it will also provide a saving in energy consumption of up to 80%.

"The relevance of this contribution is twofold. First, a 75% reduction –in comparison with previous designs– in the number of components needed will make it possible to save some of the space that the phase shifter occupies when it is integrated into a chip, and, consequently, to save in the production cost too. Moreover, reducing the number of active elements from 5 to 1 means a saving in energy consumption of up to 80%", explains the director of the UPV's ITEAM, José Capmany.

Optical phase shifters for RF signals are key elements in the installation of hybrid broadband telecommunication systems, combining optic fibre transmission and radio transmission. They are also the basis of convergence between networks, which is needed to enable access to broadband applications anytime and anywhere. They allow us, for instance, to access the mobile Internet or to change the orientation of radar and satellite antennas.

The phase shifter's applications range from radio astronomy or terrestrial satellites to microwave radio link systems, radar antennas, Ultra Wide Band communications, or RF applications for automobiles. In each of these, it contributes to improve the flow of information transmission, thus avoiding congestion and ensuring optimum performance of the entire communication system.

"Traditional phase shifters, based on microwave technologies, are limited in bandwidth and the possibility of tuning is also limited. By using photonic technology instead, we have been able to overcome both limitations", says Salvador Sales, an ITEAM researcher.

In this context, the Universitat Politècnica de València's ITEAM researchers team the Polytechnic University of Valencia have been working for several years in the European project GOSPEL (Governing the Speed of Light) for several years, aiming to develop an efficient and transferable to phase shifter based in techniques of light slowdown in semiconductors which could be transferred to the industrybased industry slowdown techniques of light .

About one year ago, Prof. Capmany's team, along with colleagues from the Technical University of Denmark, developed the first complete phase shifter with record bandwidth (50 GHz). Now, a similar performance has been achieved, but with a considerable saving both in components and in energy.

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Press Release

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