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Paolo De Natale Elected SPIE Fellow



BELLINGHAM, Washington, USA – March 7, 2012 – Each year, SPIE promotes members as new Fellows of the Society. SPIE will honor 75 new Fellows of the Society this year. Fellows are members of distinction who have made significant scientific and technical contributions in the multidisciplinary fields of optics, photonics, and imaging. They are honored for their technical achievement, for their service to the general optics community, and to SPIE in particular. More than 900 SPIE members have become Fellows since the Society's inception in 1955.

"The annual recognition of Fellows provides an opportunity for us to acknowledge Members for their outstanding technical contributions and service to SPIE," says Eustace L. Dereniak, SPIE President.

Paolo De Natale, Istituto Nazionale di Ottica – National Research Council, Italy, for achievements in frequency metrology for atomic and molecular physics.

De Natale has conducted breakthrough research across many fields of photonics, including nonlinear optics, laser physics, atomic and molecular high precision spectroscopy, frequency metrology, optical sensors and diagnostics, physics of non-linear optical crystals, and infrared coherent sources. He is responsible for many firsts in these areas, such as developing **the first fiber-based frequency comb for the mid-infrared spectral range, demonstrating its suitability for frequency metrology**. He also invented a new spectroscopic technique, based on saturated absorption cavity ring-down, which overcame, for the first time, the sensitivity limits of standard cavity ring-down spectroscopy. The new methodology is based on a spectroscopic technique with high sensitivity, named **Scar** (saturated-absorption cavity ring-down) and published in Physical Review Letters from Paolo De Natale's team a year ago. It has very recently proved to enable detection of radiocarbon-dioxide ($^{14}\text{CO}_2$) molecules down to concentrations of 43 parts per quadrillion (published in Physical Review Letters on December, 30 2011). This record spectroscopic sensitivity, aside offering a cheaper and simpler way to age artifacts via carbon dating, may find important application in areas such as monitoring climate change, environmental pollution control, biomedical research, detection of toxic or hazardous substances or for refined tests of current theories of fundamental physics.

Additionally, De Natale has **designed novel optoelectronic devices** based on ferroelectric crystals, and conducted important research on the intrinsic noise properties of quantum cascade lasers, in fact **getting the first direct measurement of the intrinsic linewidth of quantum cascade lasers**, shedding light on the underlying physics.

As part of the greater optics community, **De Natale directs the Istituto Nazionale di Ottica of the National Research Council in Italy and leads a research group at the European Laboratory for Nonlinear Spectroscopy**. He has served on program committees for more than 20 international conferences, has served as reviewer for many journals covering optics and physics, and has contributed to several books. De Natale is currently an associate editor for *Optics Express*. With SPIE, he has presented at many conferences and has been an invited speaker on multiple occasions.

SPIE, the international society for optics and photonics, was founded in 1955 to advance light-based technologies. Serving more than 180,000 constituents from 168 countries, the Society advances emerging technologies through interdisciplinary information exchange, continuing education, publications, patent precedent, and career and professional growth. SPIE annually organizes and sponsors approximately 25 major technical forums, exhibitions, and education programs in North America, Europe, Asia, and the South Pacific, and supports scholarships, grants, and other education programs around the world. See www.SPIE.org for information.

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