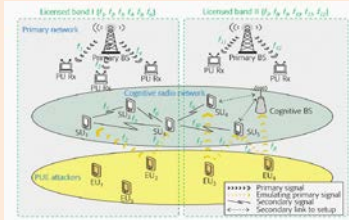


A regular update featuring works by SUTD Faculty, Researchers, Students and Research Centres/Labs. We hope to create awareness of the Research by SUTD within the SUTD community and beyond. Share with us your SUTD works today so that we can include it in our next update.

COMPUTER SCIENCE - TELECOMMUNICATIONS



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Yu, R., Zhang, Y., Liu, Y., Gjessing, S., & Guizani, M. (2016). Securing Cognitive Radio Networks against Primary User Emulation Attacks. *IEEE Network*, 30(6), 62-69.

Cognitive radio (CR) is a technology that alleviates the scarcity of the wireless spectrum. However, it can face security problems, one of which is due to primary user emulation (PUE) attacks in CR networks. Thus, the authors introduced a PUE detection method helped by databases and a defence technique against PUE attacks hinged upon admission control. A database with 2 levels combines and controls both multi-threshold fast energy detection and fingerprint-based location verification. The defence technique against PUE attacks hinged upon admission control mitigates the effect of PUE attacks on the performance of CR networks.

EDUCATION RESEARCH - ENGINEERING

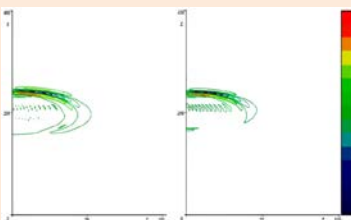


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Silva, A., Silva, J., Leite, M. & Simoes, R. (2016, October 20-21). How background affects design output: Teaching product development to mechanical engineers, industrial designers and managers. *Engineering Education (CISPEE), 2016 2nd International Conference of the Portuguese Society for Engineering Education*.

The teaching and research of product design and development hinges upon innovation, entrepreneurship, design thinking and creativity. The authors analyse similarities and differences among product development masters courses at three universities in Portugal, namely Instituto Superior Tecnico (IST) of the University of Lisbon, Instituto Politecnico do Cavado e Ave (IPCA), and ISCTE business school (IBS) of Instituto Universitario de Lisboa.

PHYSICS – APPLIED PHYSICS

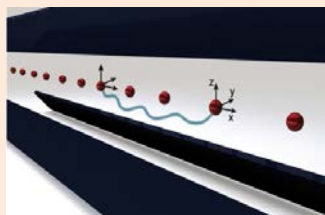


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Zhukov, A., Bouffanais, R., Belonenko, M., & Galkina, E. (2016). Three-dimensional extremely-short optical pulses in carbon nanotube arrays in the presence of an external magnetic field. *Modern Physics Letters B*, 30(34), 1650405.

The action of movement of 3D pulses through a carbon nanotube system in the presence of an external magnetic field perpendicular to the nanotube axis and to the direction of propagation of the pulse, was analysed. It was shown that the shape of propagating short optical pulses could be adjusted by varying the applied magnetic field's intensity.

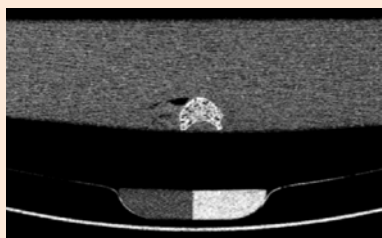
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PHYSICS—
CONDENSED MATTER

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Bissbort, U., Hofstetter, W., & Poletti, D. (2016). Operator-based derivation of phonon modes and characterization of correlations for trapped ions at zero and finite temperature. *Physical Review B*, 94(21), 214305-1-21.

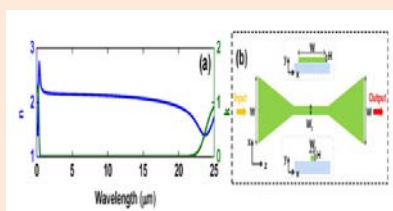
The authors illustrated the design for the general form of the quadratic Hamiltonian that features a nonbosonic, effective free-particle degree of freedom for all broken symmetries. The authors' work sets the stage for analysis of different quantum phenomena that are dynamic and are not time-dependent.

SCIENCE & TECNOLOGY—
MULTIDISCIPLINARY SCIENCES

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Anitha, D., Subburaj, K., Mei, K., Kopp, F., Foehr, P., & Noel, P. et al. (2016). Effects of dose reduction on bone strength prediction using finite element analysis. *Scientific Reports*, 6, 38441-1-9.

The authors analysed how computerised tomography (CT) imaging radiation dose reduction influenced bone strength prediction from finite-element (FE) analysis. Images of eleven vertebrae specimens were taken with multi-detector computed tomography (MDCT) at different CT imaging radiation doses. The amount of stress prior to fracture was then predicted using FE analysis. It was discovered that a reduction in CT imaging radiation dose to 64% less than usual did not affect bone strength approximations from FE analysis. This reduced CT imaging dose could make early diagnosis and advanced monitoring of osteoporosis possible.

SCIENCE & TECNOLOGY—
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Choi, J., Han, Z., Sohn, B., Chen, G., Tan, D., & Kimerling, L. et al. (2016). Nonlinear characterization of GeSbS chalcogenide glass waveguides. *Scientific Reports*, 6, 39234-1-8.

In this paper the authors analysed the nonlinear optical properties of one type of chalcogenide glass material, GeSbS that include both its nonlinear refractive index and its nonlinear absorption properties at the infra-red wave spectrum. There were negligible nonlinear losses at 1.55 μm wavelength. Self-phase modulation experiments were employed to define a nonlinear waveguide constant of $7 \text{ W}^{-1}/\text{m}$ and nonlinear refractive index of $3.71 \times 10^{-18} \text{ m}^2/\text{W}$. The authors' results indicated that GeSbS waveguides would prove useful in nonlinear optics applications at the telecommunications wavelength and beyond.