

May 2018

IMPact@SUTD is 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.



Perfect Diode in Quantum Spin Chains
Physical Review Letters

SUTD Author: Vinita Balachandran and Dario Poletti

"We have shown, both analytically and using advanced numerical simulations, a completely new approach to control spin currents based on spin-spin interactions, which results in diodes for spin current with a giant rectification."

--- Dario Poletti



Random telegraph noise in 2D hexagonal boron nitride dielectric films
Applied Physics Letters

SUTD Author: Alok Ranjan, Nagarajan Raghavan, Shubhakar Kalya and Pey Kin Leong

"Hexagonal-boron nitride (h-BN) is an atomically-flat layered-dielectric having potential to realize Graphene nanoelectronics. Here, we probe defects causing random telegraph noise (RTN) in h-BN at nanometer resolution using a UHV-CAFM. Combination of two/multi-level/anomalous RTN are observed. Furthermore, statistical analysis is used to understand role of defect generation on dielectric breakdown."

--- Alok Ranjan

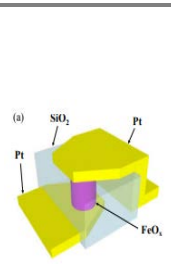


Reprocessable thermosets for sustainable three-dimensional printing
Nature Communications

SUTD Author: Biao Zhang, Kavin Kowsari, Ahmad Serjouei and Qi Ge

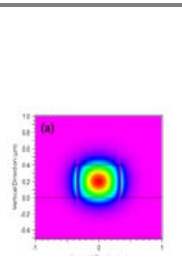
"In this study, we use two-step polymerization strategy to develop 3D Printing reprocessable thermosets. Different from traditional 3D printing thermosets, the reprocessable thermosets impart reshapeability, repairability, and recyclability into 3D printed structures, and can contribute to alleviate environmental challenges associated with the continuous increase in consumption of 3D printing materials."

--- Qi Ge



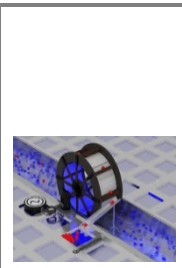
Bio-mimicked atomic-layer-deposited iron oxide-based memristor with synaptic potentiation and depression functions
Japanese Journal of Applied Physics

SUTD Author: Yi Tong



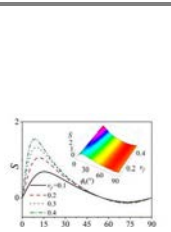
Broadband incoherent four-wave mixing and 27 dB idler conversion efficiency using ultra-silicon rich nitride devices
Applied Physics Letters

SUTD Author: Choi Ju Won, Sohn Byoung Uk, George Chen, and Dawn Tan



Classical verification of quantum circuits containing few basis changes
Physical Review A

SUTD Author: Tommaso F. Demarie, Yingkai Ouyang, and Joseph F. Fitzsimons



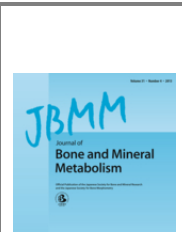
Controllable helical deformations on printed anisotropic composite soft actuators
Applied Physics Letters

SUTD Author: Dong Wang, Ahmad Serjouei, Oliver Weeger and Qi Ge



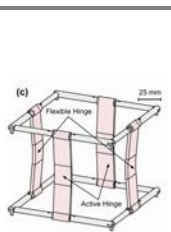
Crystallization-Induced Morphological Tuning Toward Denim-like Graphene Nanosheets in a KCl-Copolymer Solution
ACS Nano

SUTD Author: Shaozhan Huang and Hui Ying Yang



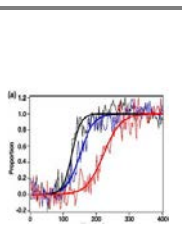
Effect of radiation dose reduction on texture measures of trabecular bone microstructure: an in vitro study
Journal of Bone and Mineral Metabolism

SUTD Author: Muthu Rama Krishnan Mookiah and Karupppasamy Subburaj



Enhanced multimaterial 4D printing with active hinges
Smart Materials and Structures

SUTD Author: Saeed Akbari, Amir Hosein Sakhaei, Kavin Kowsari, Bill Yang, Ahmad Serjouei, Zhang Yuanfang and Qi Ge



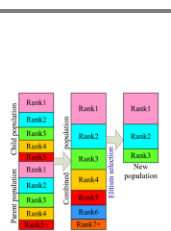
Local structure of Ge₂Sb₂Te₅ during crystallization under pressure
Applied Physics Letters

SUTD Author: Robert E Simpson



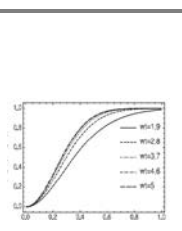
Low-Complexity Portable Passive Drone Surveillance via SDR-Based Signal Processing
IEEE Communications

SUTD Author: Chau Yuen



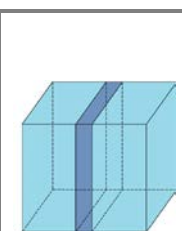
Optimal sizing of wind-PV-based DC microgrid for telecom power supply in remote areas
IET Renewable Power Generation

SUTD Author: Nandha Kumar Kandasamy



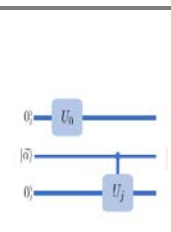
Practical somewhat-secure quantum somewhat-homomorphic encryption with coherent states
Physical Review A

SUTD Author: Si-Hui Tan and Yingkai Ouyang



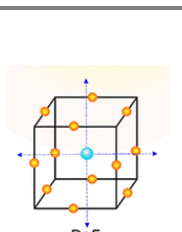
Propagation of three-dimensional bipolar ultrashort electromagnetic pulses in an inhomogeneous array of carbon nanotubes
Physical Review A

SUTD Author: Alexander V. Zhukov and Roland Bouffanais



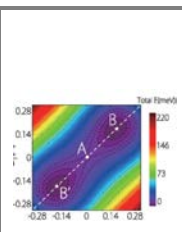
Quantum machine learning for quantum anomaly detection
Physical Review A

SUTD Author: Nana Liu



Sb₂Te₃ and Its Superlattices: Optimization by Statistical Design
ACS Applied Materials & Interfaces

SUTD Author: Jitendra K. Behera, Alok Ranjan, and Robert E. Simpson



Tunable ferroelectricity and anisotropic electric transport in monolayer β -GeSe
Physical Review B

SUTD Author: Shan Guan and Shengyuan A. Yang