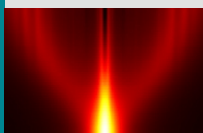


## At the front page of IRIG

### The quantum many-body systems explained to computers

An algorithm allowing the quantum many-body systems computation up to order 15 made it possible to understand the dynamics of a spin quantum bit when it interacts with neighboring electrodes and is maintained in a non-equilibrium situation.

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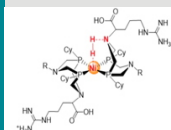
**Xavier Waintal  
Pheiliq**

*Physical Review X*, 2019

### Bio-inspired catalysts, graphene and H<sub>2</sub>-O<sub>2</sub> fuel cells

This study shows the great potential of graphenic acid to improve catalyst loading within nanostructured electrodes toward achieving high current densities with a noble-metal free molecular catalyst.

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**V. Artero - CBM  
P. Chenevier - Symmes**

*ACS Applied Materials & Interfaces*, 2019

### Plasticity of gene regulation in *Pseudomonas*

The expression of newly acquired genes is reprogrammed by evolution of regulatory sequences in order to ensure an expression more adapted to specific environments of the recipient bacterium.

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**J. Trouillon & S. Elsen  
BCI**

*Nucleic Acids Research*, 2020

### PAH and sun, a carcinogenic cocktail

The decrease in PAH metabolism by UV rays, which has never been described, induces a delay in the accumulation of DNA damage, but only the metabolized PAHs are eliminated from the skin. Exposure to UV could therefore prolong the duration of exposure in tissues.

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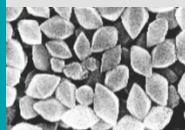
**Thierry Douki  
Symmes**

*Arch. Toxicol.*, 2019 a, b - 2020, *Toxic. in vitro*, 2020

### Reducing the mosquito population

This work paves the way for a rational adaptation of the properties of a *Bacillus thuringiensis* toxin with a perspective of extending its spectrum of action and increase its toxicity for broader use without danger to the environment.

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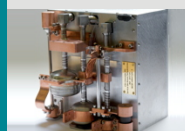
**J-P Colletier  
IBS**

*Nature Communications*, 2020

### The imprint of gravitational waves: Hot subject for cold sensors

To understand the Early Universe, the DSBT develops for Caltech and JPL NASA, autonomous consumable-free three-stage sub-kelvin cryocoolers for cooling detectors to temperatures below 300 mK.

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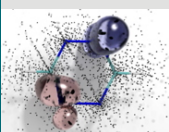


**Lionel Duband  
DSBT**

### First many-body GW calculations on a thousand atoms!

A set of theoretical innovations has just been developed, opening the way for the first time to the simulation of very large systems (of the order of a thousand atoms) in a complex electrostatic environment.

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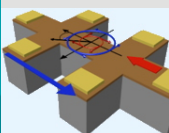
**Ivan Duchemin  
MEM**

*J. Chem. Theory Comput.*, 2020 - *J. Chem. Phys.*, 2019

### Unidirectional magnetoresistance and germanium

The unidirectional magnetoresistance (UMR) would find its origin in the two-dimensional gas of electrons where the spin of the electrons is aligned perpendicular to their displacement. UMR could be used in spintronic devices such as spin transistors.

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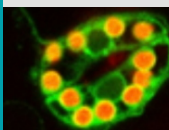
**Matthieu Jamet  
Spintec**

*Physical Review Letters*, 2020

### A novel mechanism to control protein localization in eukaryotic cells

This study sheds new light on the control of chloroplast biogenesis and opens up new perspectives in the understanding of the mechanisms that regulate its functioning.

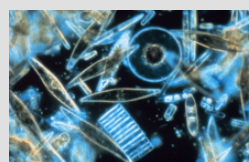
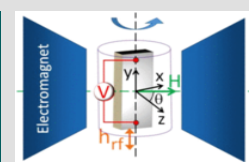
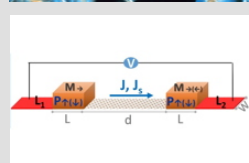
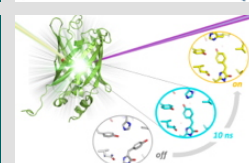
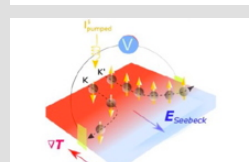
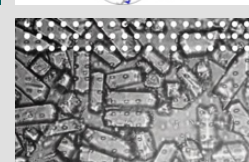
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**Norbert Rolland  
LPCV**

*Journal of Biological Chemistry*, 2019

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