

# Editoria - gennaio 2018

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## Il Nuovo Saggiatore

Il nuovo numero de *Il Nuovo Saggiatore*, Vol. 33, n. 5-6 (2017) è ora disponibile **online**.

In questo numero troverete interessanti articoli su:

- The MoEDAL experiment at the LHC: In search of magnetic monopoles
- Exploring matter at the atomic level
- Dose al paziente nelle indagini radiologiche
- Mikhail Lomonosov (1711-1756), a scientist in politically turbulent times

Nella rubrica *Il Nostro Mondo* troverete il resoconto della Cerimonia Inaugurale del 103° Congresso SIF a Trento e le relazioni dei vincitori del Premio Enrico Fermi 2017 e del Premio Giuseppe Occhialini 2017. Inoltre, ampio spazio è dato al resoconto sul Premio Nobel per la Fisica 2017 per la scoperta delle onde gravitazionali.

Per sottolineare l'importanza delle donne nella fisica, troverete infine un'intervista a Petra Rudolf e gli articoli sulle celebrazioni per il 150° anniversario della nascita di Marie Curie e sull'istituzione del Comitato Pari Opportunità della SIF.



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## Proceedings of the International School of Physics "Enrico Fermi" - Course 196

### Metrology: from Physics Fundamentals to Quality of Life

Edited by P. Tavella, M. J. T. Milton, M. Inguscio, N. De Leo

Metrology is a constantly evolving field, and one which has developed in many ways in the last four decades. This book presents the proceedings of the "Enrico Fermi" Summer School on the topic of Metrology, held in Varenna, Italy, from 27 June to 6 July 2017. This was the 6th "Enrico Fermi" summer school devoted to metrology, the first having been held in 1976. The 2017 program addressed two major new directions for metrology: the work done in preparation for a possible re-definition of four of the base units of the SI in 2018, and the impact of the application of metrology to issues addressing quality of life – such as global climate change and clinical and food analysis – on science, citizens and society. The book provides an overview of the topics and changes relevant to metrology today, and will be of interest to both academics and all those whose work involves any of the various aspects of this field.



## EPJ E – Highlights

### Membrane undulations in a structured fluid: Universal dynamics at intermediate length and time scales

*R. Granek, H. Diamant*

How biological membranes – such as the plasma membrane of animal cells or the inner membrane of bacteria – fluctuate over time is not easy to understand, partly because at the sub-cellular scale, temperature-related agitation makes the membranes fluctuate constantly; and partly because they are in contact with complex media, such as the cells' structuring element, the cytoskeleton, or the extra-cellular matrix. Previous experimental work described the dynamics of artificial, self-assembled polymer-membrane complexes, embedded in structured fluids. For the first time, Rony Granek from Ben-Gurion University of The Negev, and Haim Diamant from Tel Aviv University, both in Israel, propose a new theory elucidating the dynamics of such membranes when they are embedded in polymer networks. In a new study published in EPJ E, the authors demonstrate that the dynamics of membrane undulations inside such a structured medium are governed by distinctive, anomalous power laws.

[Read more](#)



## EPJ E – Colloquium

### A unified description of colloidal thermophoresis

*Jérôme Burelback, Daan Frenkel, Ignacio Pagonabarraga, Erika Eiser*

When colloidal particles find themselves in a temperature gradient they move in response to it, in some cases toward the hotter some toward the cooler side, depending on the specific physical chemistry of the colloid and the solvent surrounding it. This process, called thermophoresis, is generally regarded as a phoretic phenomenon: the thermal motion of a colloid is mainly driven by local hydrodynamic stresses in the surrounding liquid. However a complete and unique theoretical description of thermophoresis has been lacking. In this EPJ E Colloquium, Burelback, Frenkel, Pagonabarraga and Eiser use the dynamic length and time scale separation in suspensions to formulate a general description of colloidal thermophoresis. Their approach allows an unambiguous definition of separate contributions to the colloidal flux and clarifies the physical mechanisms behind non-equilibrium motion of colloids.

[Read more](#)



## EPJ Plus – Highlights

### Comparing Boltzmann and Gibbs definitions of entropy in small systems

*L. Ferrari*

Have you ever tried turning the spoon back after stirring jam into a rice pudding? It never brings the jam back into the spoon. This ever-increasing disorder is linked to a notion called entropy. Entropy is of interest to physicists studying the evolution of systems made up of multiple identical elements, like gas. Yet, how the states in such systems should be counted is a bone of contention. The traditional view developed by one of the fathers of statistical mechanics, Ludwig Boltzmann - who worked on a very large number of elements - is opposed to the seemingly disjointed theoretical perspective of another founding scientists of the discipline, Willard Gibbs, who describes systems with a very small number of elements. In a new study published in EPJ Plus, Loris Ferrari from the University of Bologna, Italy, demystifies this



clash between theories by analysing the practical consequences of Gibbs' definition in two systems of a well-defined size. Ferrari speculates about the possibility that, for certain quantities, the differences resulting from Boltzmann's and Gibbs' approach can be measured experimentally.  
Read more

### **EPL – Highlights from the previous volumes**

#### **A Fokker-Planck model for wealth inequality dynamics**

by *Berman Yonatan et al.*

#### **Giant edge spin accumulation in two-subband electron structures**

by *Khaetskii Alexander, Egues J. Carlos*

#### **Highway traffic fluctuations impact congestion durations**

by *Krause Sebastian M. et al.*

#### **Robustness of states at topological insulator interfaces**

by *Tadjine Athmane, Delerue Christophe*

EPL Highlights are published in the first issue of each volume, *i.e.* four times a year, as well as in Europhysics News (EPN).

