



***Symposium E: Materials with Negative Properties / 8th International  
Workshop on Auxetic & Related Materials***

**Scope of the Symposium**

The Symposium E on Materials with Negative Properties will provide an unique opportunity for Brazilian and international scientific communities to discuss together the issues regarding to this exiting research field since 8th edition of the prestigious international conference on Auxetic & Related Materials will be held this year in September as a joint site conference with sites in Poland (<http://ifmpan.poznan.pl/auxetics2011/>) and Brazil (hosted at Symposium E).

The Symposium will provide an exciting environment for the discussion of recent theoretical and experimental developments in the general of materials that display unusual negative properties, such as negative thermal expansion, negative Poisson's ratio (auxetics), negative compressibility and negative refractive index (metamaterials).

The first reports on materials exhibiting negative thermal expansion (NTE), i.e., contracting as temperature increases, go back more than 50 years. This property is not restricted to exotic classes of materials. Even familiar compounds such as hexagonal ice and water show NTE, although over a limited temperature range. The field has been growing since the re-discovery of NTE in cubic  $ZrW_2O_8$  ( $AM_2O_8$  family) in 1996. Several other classes of open-framework materials, including  $AO_2$ ,  $AMO_5$ ,  $AM_2O_7$ ,  $A_2O$  and  $A_2M_3O_{12}$  compositions, have emerged as potential sources of crystalline phases displaying low or NTE. These materials have opened up opportunities for the scientific community to exploit negative thermal expansion for a variety of applications. Negative compressibility materials expand when submitted to isostatic pressure. The emergence of nano science in last 20 years has led to the development and engineering of novel materials and properties through the design of complex architectures with engineered sizes, compositions and morphologies. For example, by controlling the ratio of single wall to multi-wall carbon nanotubes in composites their Poisson's ratio can be tuned from positive to negative values, making possible a biaxial expansion under hydrostatic pressures. Recently, it was experimentally demonstrated, for a certain wavelength range, that it is possible to design materials and systems with negative refractive index (so-called metamaterials), opening a rich research field with many envisioned applications.

The discovery of the materials with negative properties has stimulated the scientific community to pursue the development of models that both enable an understanding of the fundamental mechanisms responsible for these striking properties, and guide the development of novel materials, which could help overcome some of the technological challenges facing modern society.

**Abstracts will be solicited in (but not limited to) the following areas:**

- Negative thermal expansion materials



- Negative Poisson's ratio (auxetics)
- Negative compressibility
- Negative refractive index (metamaterials)

### Tentative list of invited speakers

**Angus Wilkinson** (Georgia Institute of Technology, USA), **Joseph N. Grima** (University of Malta, Malta); **Claudio Perottoni** (UCS – RS), **Paulo Tarso Cavalcante Freire** (UFC), **Sócrates O. Dantas** (UFJF), **Thomas Dumelow** (UERN).

### Organization Committee of the Symposium E

Bojan Marinkovic (Department of Materials Engineering – PUC, Rio de Janeiro)  
Antonio Gomes Souza Filho (Physics Department – UFC, Fortaleza)  
Douglas Soares Galvão (Physics Institute – UNICAMP, Campinas)  
Angus Wilkinson (School of Chemistry and Biochemistry, Georgia Institute of Technology, USA)

### Scientific Committee of the Symposium E

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Miroslaw Maczka (Poland Academy of Science-Wroclaw, Polónia)  
Paula Mendes Jardim (UFRJ)  
Roberto de Avillez (PUC-RJ)  
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Vitor Coluci (FT-UNICAMP)  
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### Scientific Committee of the 8th International Workshop on Auxetic & Related Materials

Andrew Alderson (University of Bolton, UK)  
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Antonio Gomes Souza Filho (UFC, Fortaleza, Brazil)  
Douglas Soares Galvão (UNICAMP, Campinas, Brazil)

# X Encontro da SBPMat

*Gramado-RS*

25 a 29 | setembro  
2011



## X Brazilian MRS Meeting 2011

Ruben Gatt, University of Malta  
Nikos Gouskos (University of Athens, Greece and WUT, Szczecin, Poland)  
Joseph N. Grima (University of Malta, MT)  
Anselm Griffin (Georgia Institute of Technology, Atlanta, USA)  
William G. Hoover (Ruby Valley, NV, USA)  
Yoshihiro Ishibashi (Aichi Shukutoku University, Nagakute-cho, Japan)  
Toshiji Kanaya (Kyoto University, Japan)  
Bojan Marinkovic (PUC, Rio de Janeiro Brazil)  
Jaroslaw Rybicki (Gdansk University of Technology, Poland)  
Fabrizio Scarpa (University of Bristol, UK)  
Christopher Smith (University of Exeter, UK)  
Angus Wilkinson (Georgia Institute of Technology, Atlanta, USA)  
Krzysztof W. Wojciechowski (IFM Polish Academy of Sciences, Poland)

**Contact:**

<http://www.sbpmat.org.br/10encontro>

**Deadline for abstract submission:**

05/30/2011