ICTCA 2017 VIENNA

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Book of Abstracts

30. Juli - 03. August 2017



Acoustic and Elastic Metamaterials

GM1 Audimax, Building BA Chaired by B. Popa

15:00 *Soda Cans Metamaterial: A Subwavelength-Scaled Phononic Crystal* (invited)
Fabrice Lemoult, Simon Yves, Nadège Kaina, Mathias Fink, Geoffroy Lerosey

15:30 *Anti-tetrachiral Lattices as Acoustic Metamaterials*
Theodore P. Martin, Kristin Charipar, Matthew D. Guild, Charles A. Rohde, Alberto Pique, Gregory J. Orris

15:50 *Nonlinear Waves in a Lattice of Magnetic Dipoles*
L. Salmerón-Contreras, N. Jiménez, **V. J. Sánchez-Morcillo**, L. M. Garcia-Raffi, R. Picó, J. F. R. Archilla

16:10 *Design and characterization of ultrasonic lenses based on generalized Cantor sets*
Sergio Castiñeira-Ibáñez, Pilar Candelas, Jose Miguel Fuster, Daniel Tarrazó-Serrano, **Constanza Rubio**

16:30 *Nonlinear Waves in Layered Ionic Crystals*
Juan F. R. Archilla, Yuriy A. Kosevich, Yaroslav O. Zolotaryuk, Víctor Sánchez-Morcillo, Noé Jiménez, Luis M. García-Raffi

Seismic Attenuation and Seismic Data Processing

Lecture Hall **GM2** Radinger, Building BD Chaired by J. Gao and H. Li

15:00 *Q Estimation from the Envelope Peak Instantaneous Frequency based on Generalized Seismic Wavelet*
Guowei Zhang, Jinghuai Gao

15:20 *Anti-aliasing in Kirchhoff beam migration*
Bangyu Wu, Hui Yang, Jinghuai Gao

15:40 *Seismic Instantaneous Attributes Extraction and Applications to Reservoir Characterization*
Naihao Liu, Jinghuai Gao, Bo Zhang, Xiudi Jiang, **Qian Wang**

16:00 *A robust and precise seismic dip estimation method based on instantaneous phase*
Xiaokai Wang, Wenchao Chen, Jinghuai Gao, **Haixia Zhao**, Changchun Yang

16:20 *The DAS coupling noise removal using alternating projection iteration with united sparse transforms*
Jianyou Chen, Wenchao Chen, Xiaokai Wang, Dawei Liu, **Bangyu Wu**

16:40 *Random noise attenuation of seismic data using variational mode decomposition and time-frequency peak filtering*
Zhen Li, Jinghuai Gao

Nonlinear Waves in Layered Ionic Crystals

Juan F.R. Archilla[1], Yuriy A. Kosevich[2], Yaroslav O. Zolotaryuk[3], Víctor Sánchez-Morcillo[4], Noé Jiménez[4], Luis M. García-Raffi[4]

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Ionic crystal force fields are dominated at intermediate distances by Coulomb interaction. Typical layered structures like some silicates are composed of ions of the same sign, as for example, cations, surrounded by layers of ions with opposite sign, i.e., negative. Short range forces are also predominantly Coulomb repulsion between the nuclei screened by the ion electrons and Pauli repulsion. Therefore, the in-layer interaction is repulsive and the interaction between the cation layer and the sheets is a combination of electric attraction and short-range repulsion with a equilibrium distance. The out-of-plane layers provide an on-site potential which breaks the translational invariance in the plane with a periodic potential, which produces significant changes in the properties of propagation of nonlinear waves. The finite potential barriers between sites allow for the movement of ions at high energies. The different types of nonlinear waves that occur in the cation layers can be classified as extended nonlinear waves, nanopterons, intrinsic localized modes, solitons and kinks or shock waves. The latter have the property of transporting mass and charge, which allow for experimental measurements of currents. The physical implications of the existence of these different waves are analyzed.
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References

[1] J. F. R. Archilla, Yu A. Kosevich, N. Jiménez, V. J. Sánchez-Morcillo, and L. M. García-Raffi, *Ultradiscrete kinks with supersonic speed in a layered crystal with realistic potentials*, Phys. Rev. E **91** (2015), no. 2, 022912.

[2] J. F. R. Archilla, Yu. A. Kosevich, N. Jiménez, V. J. Sánchez-Morcillo, and Luís M. García-Raffi, *A supersonic crowdion in mica*, Quodons in mica: nonlinear localized travelling excitations in crystals (J. F. R. Archilla, N. Jiménez, V. J. Sánchez-Morcillo, and L. M. García-Raffi, eds.), Springer Ser. Mater. Sci., vol. 221, 2015, pp. 69–96.

[3] J. F R. Archilla, Yuriy A. Kosevich, N. Jiménez, V. J. Sánchez-Morcillo, and L. M. García-Raffi, *Moving excitations in cation lattices*, Ukr. J. Phys. **58** (2013), no. 7, 646–656.

[4] Juan F. R. Archilla, Yu A. Kosevich, Noé Jiménez, Víctor J. Sánchez-Morcillo, and Luís M. García-Raffi, *Supersonic kinks in Coulomb lattices*, Localized Excitations in Nonlinear Complex Systems (R. Carretero-González et al., eds.), Springer, Cham, 2014, pp. 317–331.