Novel plasma properties such as self-consistent non-gyrotropic equilibria and orientation asymmetries with respect to the magnetic field are presented.
We investigate the linear and nonlinear dynamics of the plasma waves that propagate in a non-gyrotropic plasma.
Finally we analyze, within the small Larmor radius limit, the effect of the plasma anisotropy on the linear and nonlinear development of the Kelvin-Helmholtz instability of a shear flow. This latter study is performed in the context of the interaction between the solar wind and the Earth's magnetosphere.

#P139 - Scientific studies for the restoration of "Madonna con Bambino e San Giovanni", a venetian school panel painting of the end of sixteenth century of Museo Diocesano of Palermo.

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The scientific investigations aimed to the study, characterization and conservation of archaeological and artistic finds are in general based on a strong interdisciplinary approach and they allow, beside historical and artistic evaluations, to answer to questions about the dating, painting materials and technique, authors, artistic production area or movements or schools and also about authenticity of antique paintings.
The aim of this research was to assess the techniques used to create and decorate the wooden painting and to verify the state of preservation of the finishing materials of the artwork.
For that reason an integrated analytical approach based on the use of non-invasive and micro-invasive techniques was used, with the aim to obtain a characterization of the wooden panel, to elucidate the painting technique, including the stratigraphic sequence of the pigments and the organic binders employed, the state of preservation, the possible decay processes and the possible additions made during previous restorations.
The painting on wood panel (33 x 49 cm) "Madonna con Bambino e San Giovanni" represent the "Madonna della Consolazione", referring to byzantine "Odeghetria"; it is attributed to unknown cretan-venetian artist and probably dated to the end of 16th century and it is conserved in the Museo Diocesano of Palermo.
At first the painting was analyzed by non-invasive techniques: macrophotography and photography under IR, UV and visible radiation (raking light) and Imaging techniques like IR reflectography (IRR) and false color infrared (IRFC), followed by spectroscopic ones, like reflectance spectrometry in the visible range (vis-RS) and X-ray fluorescence (ED-XRF), were chosen as informative first-step analyses. Then, after sampling, micro-fragments of the painting material were analyzed by several analytical techniques: optical microscopy, scanning electron microscopy with energy dispersive spectroscopy (SEM-EDS) and FTIR spectroscopy. Finally, for the restoration of the painting it was also used the analysis named colorimetry.
Data suggest a traditional painting technique, characterized by a single wooden panel, a thin white preparatory layer of gypsum and animal glue (< 1 mm), a dark priming ("imprimitura"), an engraved underdrowing and a paint layer composed by pigments dissolved in both egg and oil containing binding medium. The highlights ("lumeggiature") on the dress and the nimbus are gilded with "a missione" technique (oil gilding or oil mordant or mordant gilding)while the globe in Baby Jesus hand is gilded with the technique named "a guazzo" (water gilding); in fact it is also present a reddish-brown preparatory layer (Armenian bole) composed of iron oxide with aluminosilicates.

#P140 - Microscopic approach to investigate constitutive materials and technique of San Vito wooden pulpit of Museo Diocesano of Palermo

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Magnificent artworks (panel paintings, architectural elements, statues, altars, sarcophagi, etc.) have been created in any culture using wood as the main constitutive material, especially for the supports. Many decorative techniques have been used on wood, with or without a preparation layer, by carving the ornamental elements, applying pigments and gold or silver leaves and inlaying ivory or mother-of-pearl, etc. Several organic binding and gluing *media* have been used: proteinaceous materials, drying oils, waxes, resins and vegetable gums.

The aim of this research was to assess the techniques used to create and decorate the wooden pulpit of San Vito and to verify the state of preservation of the finishing materials of the artwork.
The San Vito wooden pulpit (210 x 120 x 100 cm), attributed to unknown artist, coming from the oratory of San Vito and conserved in the Museo Diocesano di Palermo, has a linear structure typically nineteenth century, made by assembling many components; it is decorated by three polychrome and gilded panels representing events of the martyr life, probably dated to the end of 17th century.
Micro-fragments of the support and of the painting material were analyzed by several analytical techniques: optical microscopy, scanning electron microscopy with energy dispersive spectroscopy (SEM-EDS) and FTIR spectroscopy.
Observations through the various microscopes revealed that a proteinaceous pittoric layer (probably a tempera), light green coloured, was directly applied onto the wood of the linear structure, without a preparation.
Decorative panels are well conserved and the original polychrome decorations and gilding are still preserved. In particular, the *recto* of panels is entirely covered by gold leaf, applied with the technique named “a guazzo” (water gilding) on a preparation composed by a first white layer with gypsum and animal glue and a second one with bole.The pigments are applied on gold leaf by thin and transparent brushstrokes. The palette is composed by pigments and lacquers using oil as binding*medium*.
Therefore the scientific analyses confirmed the preliminary observations about the pulpit, formed by a structure of the 19th century and by decorative panels of the end of 17th century, probably coming from another ancient artwork.

#P141 - A model for 1/f Noise in Polymer Nanofibers

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In recent years great advancements have been achieved in the field of organic electronics, driven by the strong interest in producing low-cost and flexible electronic devices [1,2]. Practical applications of these devices require understanding and controlling current fluctuations, especially in the low-frequency regime which can seriously limit the device performances. Actually, for frequency f < 100 KHz, 1/f flicker noise is usually observed in all electronic devices, including nanowires, nanocrystals and organic thin films devices [1-4]. However, the changes in 1/f noise upon moving from bulk organic materials to nanostructures is still poorly investigated. This motivates the interest in studying flicker noise in nanostructures such as polymer nanofibers. Polymer nanofibers, similarly with other nanostructures with lateral confinement, generally exhibit a charge-carrier mobility significantly enhanced with respect to thin films made of the same conjugated material, as a consequence of a more ordered molecular arrangement [5,6]. Very recently we have investigated [7] the effect of lateral confinement on flicker noise in OFETs based on conductive conjugated polymers, poly(3-hexilthiophene) (P3HT) [5,6]. The noise in these devices, working in accumulation regime in air conditions, is well described by the Hooge model, suggesting a behavior dominated by mobility fluctuations. Importantly, the average Hooge parameter, controlling the relative power spectral density of current fluctuations is suppressed by about two orders of magnitude with respect to the values measured for thin-film devices based on the same active material [7]. To explain these results we have developed a resistor network model, in which the organic semiconducting nanostructures or films are depicted through a two-dimensional network of resistors. The numerical results of the model [7] agree with the experimental findings [7], supporting the role of size-confinement in organic nanostructures as effective route to improve the noise performance in polymer based electronic devices. [1] P. V. Necliudov, S. L. Rumyantsev, M. S. Shur, J. Appl. Phys., 88, 5395 (2000). [2] A. Balandin, Nature Technol., 8, 549 (2013). [3] Yu-M. Lin, J. Appenzeller, J. Knoch, Z. Chen, P. Avouris, Nano Letters, 6, 930 (2006). [4] Y. Lai, H. Li, D. K. Kim, B. T. Diroll, C. B. Murray, C. R. Kagan, ACS Nano, 8, 9664 (2014). [5] M. Aryal, K. Trivedi, W. W.Hu, ACS Nano, 3, 3085 (2009). [6] T. Shimomura et al., Phys. Rev. B, 83, 115314 (2011). [7] F. Lezzi, G. Ferrari, C. Pennetta, D. Pisignano, submitted for publication.

#P142 - Non-linear transport of hot-electrons in a InP bulk operating under fluctuating fields

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The complexity of electron dynamics in low-doped n-type InP crystals operating under fluctuating electric fields is deeply explored and discussed. In this work, we employ a multi-particle Monte Carlo approach to simulate the non-linear transport of electrons inside the semiconductor bulk. All possible scattering events of hot electrons in the medium, the main details of the band structure, as well as the heating effects, are taken into account. The results presented in this study derive from numerical simulations of the electron dynamical response to the application of a sub-Thz electric field, fluctuating for the superimposition of an external source of Gaussian correlated noise. The electronic noise features are statistically investigated by computing the correlation function of the velocity fluctuations, its spectral density and the variance, i.e. the total noise power, for different values of amplitude and frequency of the driving field. Our results show the presence of a cooperative non-linear behaviour of electrons, whose dynamics is strongly affected by the field fluctuations. Moreover, the electrons self-organize among different valleys, giving rise to the reduction of the intrinsic noise. This counterintuitive effect critically depends on the relationship among the characteristic times of the external fluctuations and the temporal scales of complex phenomena involved in the electron dynamical response. In