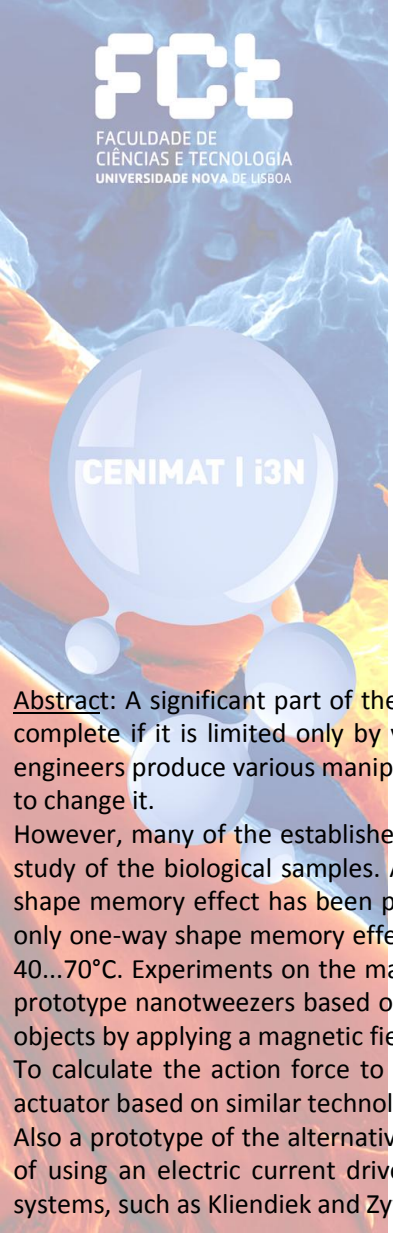

SEMINÁRIO

Data: 15 de Outubro de 2014
Hora: 16h00
Local: Anfiteatro Leopoldo Guimarães

"Micro- and nanomechanical tools with shape memory effect for scientific researches, electronics and biomedical technology"

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Abstract: A significant part of the modern science aims to explore the micro- and nanoworld. But this study will never be complete if it is limited only by visual observation. For the full interaction with the micro- and nanoworld scientists and engineers produce various manipulators that can be used to manipulate the nanoobject under investigation study and even to change it.

However, many of the established manipulators have similar disadvantages such as a massiveness and an inability for the study of the biological samples. As the solution the scheme on the basis of the layered composite Ti50Ni25Cu25/Pt with shape memory effect has been proposed and tested. This scheme provides a giant reversible bending deformations using only one-way shape memory effect. Nanotweezers are activated by heating with a laser and the temperature range is only 40...70°C. Experiments on the manipulation of the micro- and nanosamples and biological objects were performed. Also a prototype nanotweezers based on a ferromagnetic Heusler alloy Ni53Mn24Ga23 with shape memory effect to manipulate objects by applying a magnetic field and, as a consequence, at a constant temperature was proposed [1-4].

To calculate the action force to the object of the nanotweezers' actuator a technique to determine the stiffness of the actuator based on similar technology for cantilevers of atomic force microscopes has been developed and tested.

Also a prototype of the alternative nanotweezers' heating system was proposed. It can eliminate the laser heating in favor of using an electric current driven heater. Such a system can be quit compatible with conventional micromanipulation systems, such as Kliendiek and Zyvex.

References

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