DOTTORATO DI RICERCA
UNIVERSITÀ DI PISA

DIPARTIMENTO DI FISICA "ENRICO FERMI"

Scuola di Dottorato in Scienze di base "Galileo Galilei"
Dottorato in Fisica

AVVISO DI SEMINARIO

Martedi 10 Gennaio 2012
ore 11:00

Dipartimento di Fisica
Sala 248 - I piano - Ed. C

Prof. Thorsten Schumm

Vienna University of Technology
Institute of Atomic and Subatomic Physics

"Towards a solid-state optical nuclear clock"

The radio isotope ^{229}Thorium shows a remarkable and unique property: it possesses an extremely low-energy excited (isomer) state of the nucleus which is expected around 7.6 eV. It might hence be possible to directly excite the atomic nucleus with UV (laser) radiation, creating a bridge between atomic and nuclear physics. The (expected) narrow line width of the transition makes it a promising candidate for a new frequency standard. The excellent shielding of the nuclear transition by the electron shell allows to implant (dope) ^{229}Thorium into UV transparent crystals and hence the realization of a solid state “nuclear atomic clock”. In this presentation I will review the quest for the low-energy transition and discuss experimental approaches towards a new “nuclear” frequency standard. Experimental progress towards sample crystals and first characterization measurements are presented.

M.Tonelli