



DIPARTIMENTO DI FISICA "E.Fermi"

UNIVERSITÀ DI PISA

CORSO DI DOTTORATO IN FISICA

Largo B.Pontecorvo,3 - Edificio B-C

56127 PISA - ITALY

CORSO DI DOTTORATO IN FISICA **AVVISO DI SEMINARIO**

Giovedì 13 Marzo 2008

ore 11:00

Dipartimento di Fisica

Largo B.Pontecorvo, 3

Sala 148 - piano orimo - Ed. C

Prof. Philippe Goldner

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"Rare earth doped materials for quantum information processing"

Abstract:

Rare earth doped crystals are well known as efficient light emitting materials and have found important applications in lasers, display technology or scintillation. Recently, these materials have also been considered as promising systems in a new research field: quantum information (QI). In this area, the unique properties of quantum systems are used to manipulate data in a non-classical way. Current applications of QI include quantum computing (QC) and quantum storage (QS). The latter aims at storing the quantum state of a photon and is the key to quantum cryptography over long distances. On the other hand, a quantum computer is theoretically able to perform some calculations (e.g. prime number factorizing) much faster than a classical computer.

Although some promising results on QS and QC have been obtained in gases or liquids, a solid state system would be much closer to applications. In this field, several teams have obtained important results in rare earth doped crystals. In this lecture, these recent results as well as specific material designs will be discussed.

M. Tonelli