各位

理学系研究科物理科学専攻では、以下の日程でパレルモ大学物理学部准教授　Roberto Passante 博士を招聘し、下記の日程で講義を行います。関心のある方はどうぞご参加ください。

講師　**Prof. Roberto Passante**
(Dipartimento di Fisica, Università degli Studi di Palermo, Italy)

紹介：Passante 博士は量子光学、非平衡統計力学分野における著名な理論研究者であり、特に、原子と輻射場が相互作用する系の dressed state の研究に関する世界的権威であり、この分野における著名な教科書”Atoms-Field Interactions and Dressed Atoms”を著しておられます。講義は、この分野に関してもなじみの無い方でも分かりやすいものですので、関心のある方のご参加を歓迎いたします。

滞在期間　　2011 年 7 月 20 日（水）～ 8 月 19 日（金）
ホスト教員　田中　智（理学系研究科物理科学専攻）

フレッシュマンセミナー（学部１年生対象）
this is mainly a lecture on the historical side of the subject
日時：７月２２日（金）第４限１４：３５～１６：０５
教室：B3-303
Title:
From atoms to quarks: an overview of the fundamental interactions between particles
Abstract:
An historical overview on the fundamental structure of matter is given, starting from the first atomic models to the modern view of the elementary particles as given by the standard model. In this model, the fundamental particles are the leptons and the quarks constituting the hadrons, plus the quanta of the fundamental interactions between them.

3rd grade undergraduate:

物理科学演習（学部３年生対象）
日時：７月２１日（木）第３限１２：５５～１４：２５
教室：A13-323
Title:
Atomic models and atomic spectra
Abstract:
In this lecture the Thomson, Rutherford and Bohr atomic models are presented, which led to the birth of quantum mechanics. In particular, it is discussed how the Bohr model, and quantum mechanics, give a good explanation of the main aspects of the spectral lines and the spectral series of the hydrogen atom.

物理科学演習（学部３年生対象）
日時：７月２６日（火）第２限１０：４０～１２：１０

教室：A5-307

Title:

Phenomenology of radiative processes and the Einstein coefficients

Abstract:

The phenomenology of the basic radiative processes, that is absorption of radiation and stimulated and spontaneous emission of radiation, is discussed in terms of the Einstein coefficients. Rate equations and their solution are also discussed from a physical point of view.

First and second grade master graduate:

サイエンスコミュニュケーション I & II（大学院生対象）

日時：７月２１日（木）第２限１０：４０～１２：１０

教室：A13-323

Title

Vacuum fluctuations and their physical consequences: Lamb shift and Casimir forces

Abstract:

The main consequences of the existence of zero-point fluctuations of the quantum electromagnetic field are discussed. In particular it is shown how they lead to important phenomena such as the Lamb shift of spectral lines, the spontaneous emission of radiation and finally to Casimir and Casimir-Polder forces, which are forces of electromagnetic nature between neutral objects (atoms/molecules or macroscopic bodies).

サイエンスコミュニュケーション I & II（大学院生対象）

日時：７月２５日（月）第１限９：００～１０：３０

教室：A13-323

Title:

Quantum dots

Abstract:

Quantum-confined structures such as quantum wells, wires and dots are discussed. The properties of the electrons in such structures are discussed and compared to the case of bulk systems. Optical properties of quantum dots, and phenomena such as vacuum Rabi oscillations and vacuum Rabi splitting, observed in recent experiments, are also discussed.

オープンセミナー（学部生、大学院生、教員対象）

日時：８月２日（火）第５限１６：１５～１７：４５

教室：サイエンスホール

Title:

Partially dressed atoms and dynamical Casimir-Polder forces

Abstract:

We consider the dynamical Casimir-Polder force on an atom placed near an infinite conducting wall. The system is initially in a nonequilibrium configuration such as a bare or a partially dressed state, and its time-evolution is considered as well as the time-dependence of the atom-wall Casimir-Polder interaction. A possible scheme to generate experimentally the initial partially dressed state and to detect the dynamical Casimir-Polder force is discussed.

代表的文献

1) G. Compagno, R. Passante, F. Persico, "*Atom-Field Interactions and Dressed Atoms*", (Cambridge Univ. Press, 1995).

2) Riccardo Messina, Ruggero Vasile, Roberto Passante, *Dynamical Casimir-Polder force on a partially dressed atom near a conducting wall*, Phys. Rev. A **82**, 062501 (2010)

3) R. Vasile, R. Passante, "Dynamical Casimir-Polder force between an atom and conducting wall", Phys. Rev. A **78**, 032108 (2008).

3) R. Passante, S. Spagnolo, "Casimir-Polder interatomic potential between two atoms at finite temperature and in the presence of boundary conditions", Phys. Rev. A **76**, 042112 (2007).

4) L. Rizzuto, R. Passante, F. Persico, "Nonlocal properties of dynamical three-body Casimir-Polder forces", Phys. Rev. Lett. **98,** 240404 (2007).