PROGRAMAS E BIBLIOGRAFIAS

1 º período letivo de 2015

DISCIPLINA	NOME
F 015	Tópicos de Física Aplicada V

Horas Semanais

Teóricas	Práticas	Laboratório	Orientação	Distância	Estudo em Casa	Sala de Aula
02	00	00	00	00	00	02
Nº semanas	**Carga horária total**		**Créditos**	**Exame**	**Frequência**	**Aprovação**
15	30		02	S	75	N

Horário em Sala de Aula (Teóricas/Práticas/Laboratório):

3:16 3:17

Ementa:

Objetivos:

Pré-Requisito (se houver):

1. Estrutura da Matéria or equivalent introductory Quantum Mechanics course. (F 589)
2. English: the student should be able to understand a Physics lecture and read Physics books and articles. CEF equivalent level B2 is desired, B1 or A2 accepted.

Programa:

UNICAMP – Universidade Estadual de Campinas
IFGW – Instituto de Física "Gleb Wataghin"
Rua Sérgio Buarque de Holanda, 777 - Cidade Universitária – Barão Geraldo – Campinas/SP – 13083-859
Secretaria de Graduação – (019) 35215303

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1 º período letivo de 2015

The Physics of the Rare Earth Elements

Prof. Leandro R. Tessler

Rare earth elements have special properties due to their peculiar electronic configuration that condemns them to ostracism (there is no room for them in the periodic table and they have to occupy two extra rows). However, this special electronic configuration is the cause of very interesting optical and magnetic properties. In this introductory course we will discuss the special properties of rare earth ions in solids due to the peculiar properties of the partially filled *4f* electron layer.

Program:

1. Background. Schroedinger equation for multi-electronic atoms. Hartree-Fock approximation. Spin-orbit interactions. The periodic table. The rare earth elements.
2. Rare earth ions in solids
    a. Effective hamiltonians
    b. Crystal field theory
    c. Judd-Offeld formulation
    d. Energy level calculations
3. Experimental activity
    a. Measurement of optical emission and interpretation of the atomic-like spectrum

The course shall be taught in **English.** It will be an opportunity to develop comprehension of the language by the students

The course is open to Physics, Chemistry and Electrical Engineering students interested in Materials, Optical Spectroscopy and in Optical Communications.

Bibliografia:

S. Hüfner, Optical Spectra of Transparent Rare Earth Compounds, Academic Press, New York, 1978
G. H. Diecke, Optical Properties of Ions in Crystals, Interscience, New York, 1967.
G. H. Diecke and H. Crosswhite, Spectra and Energy Levels of Rare Earth Ions in Crystals, Interscience, New York, 1968.
B Henderson and G. F. Imbusch, Optical Spectroscopy of Inorganic Solids, Clarendon, Oxford, 1989.
G. Blasse and B. C. Grabmeyer, Luminescent Materials, Springer, Heidelberg, 1994
P. Hänninen, H. Härmä, Lanthanide Luminescence, Springer Series on Fluorescence, Springer, Heidelberg, 2011.
G. Liu, B. Jacquier, Spectroscopic Properties of Rare Earths in Optical Materials, Springer, Heidelberg, 2005.
M. Reid, Electronic Structure and Transition Intensities in Rare-Earth Materials, University of CVanterbury, 2013

Critérios de Avaliação:

Assessment will be based in student performance in proposed exercises, and experimental work. Students will be assigned tasks and/or activity reports.

Observações:

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ASSINATURAS:

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