

# \* COLÓQUIO - IFUSP

## “Fundamental constants, Gravity and cosmology”

Fundamental constants are a cornerstone of our physical laws. Any constant varying in space and/or time would reflect a violation of the equivalence principle. Thus, it is of importance for our understanding of gravity and of the domain of validity of general relativity to test for their constancy. I will first recall the relations between the constants, the tests of the local position invariance and of the universality of free fall. I will then sketch the main theoretical frameworks in which the low-energy constants may actually be varying. Many experimental and observational constraints have been obtained from atomic clocks, the Oklo phenomenon, solar system observations, meteorite dating, quasar absorption spectra, stellar physics, pulsar timing, the cosmic microwave background and big bang nucleosynthesis. I will provide a Summary of these observations. To finish, cosmology, and in particular the models of the early universe, allows to address the question of understanding their numerical values. While very speculative, and probably out of reach of any experimental or observational check, this may be the only insight to understand the apparent fine-tuning that the constants seem to confront us with.

**Dr. Jean-Philippe Uzan**

**CNRS e Instituto de Astrofísica de Paris**

**Dia: 25.04.2013**

**Horário: 16h00**

**Local: Auditório Abrahão de Moraes – IFUSP**

**ENTRADA FRANCA**

**Video no site: <http://web.if.usp.br/pesquisa/node/435>**



**Apoio:**

**Pró-Reitoria de  
Pesquisa da USP  
Diretoria do IFUSP**

**Organização**

**Comissão de Pesquisa  
[cpqif@if.usp.br](mailto:cpqif@if.usp.br) - 3091.7114**