

5th INPE ADVANCED COURSE
An Overview of Cosmology in the Era of Large Telescopes:
Theory, Observations and Simulations.
September 16 - 20, 2013

In Honor of Prof. José Antônio de Freitas Pacheco

Invited Lecturers

Dr Brice Menard (John Hopkins Univ., USA)

Large Scale Structure of the Universe - Large Surveys

Dr Graça Rocha (Caltech/JPL, USA)

CMB/Planck

Dr John Leslie (Univ. of Guelph, Canada)

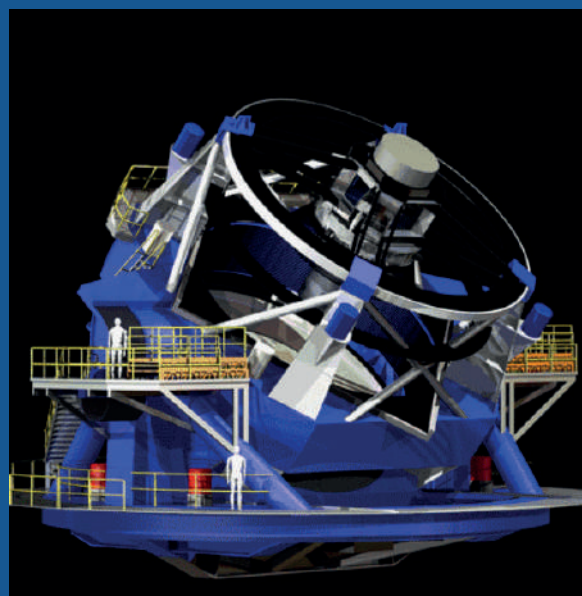
The Mystery of Existence: Why is there anything at all?

Dr Krzysztof M. Gorski (JPL/Caltech, and Warsaw University Observatory, USA & Poland)

Flattening the Sphere: HEALPix – Concept and Applications to Effective Handling and Analysis of Full Sky Data Sets

Dr Neal Katz (Univ. of Massachusetts, USA)

Cosmological Simulations



Advisory Board

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Rationale

The questioning about the Universe we inhabit is one of the main characteristics of the human species. Since dawn of human civilization, men wonder what the Universe is and why it is what it is.

Cosmology, as a science of the Universe, in the last few decades has provided an important physical description of the world as we know it. In the 80's, several galaxy surveys reaching beyond our cosmic neighborhood demonstrated how clustered the Universe is in scales as large as 100 Mpc. More recently, the study of the cosmic microwave background has revealed the small density fluctuations that originated the galaxies and clusters of galaxies that we observe today.

Another important component of this enterprise is the use of numerical simulations to address questions that otherwise would be hard to face. Today, large consortiums have embarked on simulating the Universe with unprecedented resolution and taking into account the complexity of the gas dynamics.

In an era of global collaborative science, where Brazil is joining the ESO community and is exchanging students and researchers through the governmental program "Sem Fronteiras", bringing the state of the art in cosmology to both students and faculty members is mandatory if Brazil intends to become more competitive. These are aspects of paramount importance to establishing a roadmap for cosmology.

The main objective of the Fifth INPE Advanced Course is to present and discuss the different aspects of current research in cosmology, for both Brazilian and international participants. The lectures will focus on the following topics: 1) Cosmic Microwave Background, with emphasis on the new results from Planck (Dr. Graça Rocha and Dr. Krzys G. Gorski);

2) the large scale structure as unveiled by the recently completed Sloan Digital Sky Survey (Dr. Brice Menard); and 3) cosmological simulations, which became an essential part of the research in this field (Dr. Neal Katz). Another important topic of the school will be addressed by a renowned philosopher, Dr. John Leslie - "The mystery of the existence".



Program

Lecture I

Dr Brice Menard (John Hopkins Univ., USA) Lectures in pdf
Large Scale Structure of the Universe - Large Surveys

Introduction to the night sky
From detectors to images
Statistical tools
Photometric surveys
Spectroscopic surveys

Lecture II

Dr Graça Rocha (Caltech/JPL, USA) Lectures in pdf
CMB/Planck

The Physics of CMB I: Cosmological perturbations; Statistics of random fields;
Temperature anisotropies; Polarization of the CMB; Anisotropy Power
Spectrum;

The Physics of CMB II: physics of the CMB: Mechanisms for primary fluctuations:
Sachs Wolfe effect, Acoustics Peaks; Silk damping, damping of the CMB power
spectrum; tensor perturbations - gravitational waves; B-modes;

Numerical Tools to study the CMB: CAMB, CosmoMC, NGsims
CMB and the Large Scale Structure in the Universe: Galaxy formation and
clustering, non-linear gravitational clustering; CMB lensing, SZ effect; putting
observations together.

Lecture III

Dr John Leslie (Univ. of Guelph, Canada) Lectures in pdf
The Mystery of Existence: Why is there anything at all?

Introduction to "Why anything?"
Eternal Cosmos or Quantum Big Bang?
Fine-tuning and many Universes



Anthropic Principle
Reasonless existence or creation by God?

Lecture IV

Dr Krzysztof M. Gorski (JPL/Caltech, and Warsaw University Observatory, USA & Poland) Lectures in pdf

Flattening the Sphere: HEALPix – Concept and Applications to Effective Handling and Analysis of Full Sky Data Sets

Beyond the standard lore: CMB anomalies, isotropies and non-gaussianity
Special Lecture - Healpix

Lecture V

Dr Neal Katz (Univ. of Massachussets, USA) Lectures in pdf
Cosmological Simulations

Galaxy Formation: Numerical Techniques
Galaxy Formation: Birth of the Cool
Galaxy Formation: Ins and Outs
Galaxy Formation: Bayesian SAMs Methods
Galaxy Formation: Bayesian SAMs Results

Lecture VI - Distinguished Lecture

Dr J. A. F. Pacheco (Observatoire de la Côte d'Azur, France) Lectures in pdf
Cosmology in Brazil - 45 years of history

Schedule	Monday	Tuesday	Wednesday	Thursday	Friday
09h00 - 10h00	V	III	V	I	III
10h00 - 10h45			COFFEE-BREAK		
10h45 - 11h45	II	I	I	V	V
12h00 - 14h00			LUNCH		
14h00 - 15h00	III	V	IV	III	II
15h00 - 16h00	I	II	III	I	IV
16h00 - 16h30			COFFEE-BREAK		
16h30 - 17h30				II	VI



Hotels

The prices below have been quoted in May 23th. Please confirm the values at the booking. The event has no arrangement with any hotel.

Hotel Faro

Address: Rua Siria, 25 - Jd. Oswaldo Cruz - São José dos Campos - SP
Phone: +55 12 3512-9600

Single room: R\$ 119,00

Double room: R\$ 155,00

Plus 5% tax; Breakfast, parking and Internet included.

Hotel Ibis

Address: Av. Dr. Jorge Zarur, 81 - Tour I - Jardim Apolo - S.J. Campos
Phone: +55 12 3904-2400
Email: h6035-re@accor.com.br

Single room: R\$ 119,00

Double room: R\$ 119,00

Internet WiFi available, Breakfast: R\$ 13,00/day and Parking: R\$ 7,00/day

Hotel Lareira

Address: Rua Ademar Guedes de Oliveira, 193 - Vila Piratininga (close to bus station Nova)
Phone: +55 12 3921-9829

Single room: R\$ 60,00

Double room: R\$ 90,00

Triple room: R\$ 130,00

Breakfast, parking and Internet included.

Hotel Lisboa

Address: Rua Major Antônio Domingues nº 344 - Centro
Phone: +55 12 3921-8155 - +55 12 3921-3564
E-mail: hotelisboa@hotellisboa.net

Single room: R\$ 70,00

Double room: R\$ 95,00

Triple room: R\$ 125,00

Breakfast, parking and Internet included.

Hotel Mercure



Address: Av. Dr. Jorge Zarur, 81 - Tour II - Jardim Apolo - S.J. Campos
Phone: +55 12 3904-2300
E-mail: h5168-re@accor.com.br

Single room: R\$ 194,00 + 5%
Double room: R\$ 214,00 + 5%
Internet WiFi available
Parking: R\$ 7,00/day
Breakfast: R\$ 20,00/day
Hotel Othon Intervale

Address: Rua Lupércio Antônio dos Santos, 31 - VI Bethania - São José dos Campos - SP
Phone: +55 12 3925-5500

Single room: R\$ 144,00
Double room: R\$ 166,00
Triple room: R\$ 196,00
Plus 5% tax; Breakfast, parking and Internet included.
Hotel Plaza

Address: Rua Presidente Bernardes, 33 - Jardim Paulista
Phone: +55 12 3947-7669

Single room: R\$ 74,00
Double room: R\$ 94,00
Triple room: R\$ 114,00
Breakfast, parking and Internet included.

Hotel Pousada Bandeirante

Address: Avenida dos Astronautas, 1021 - Jardim da Granja
Phone: +55 12 3922-7506

Single room: R\$ 30,00
Double room: R\$ 50,00
Triple room: R\$ 75,00
Breakfast, parking included.

Hotel San Marco

Address: Avenida Dr. Adhemar de Barros, 457 - Vila Adyana
Phone: +55 12 3922-5244

Single room: R\$ 80,00
Double room: R\$ 105,00
Breakfast, parking and Internet included.
Shelton Inn Hotel



Address: Av. Dr. João Guilhermino, 287 - Centro - São José dos Campos - SP

Phone: +55 12 3941-8588

Single room: R\$ 130,00

Double room: R\$ 145,50

Triple room: R\$ 170,00

Breakfast, parking and Internet included.

Hotel Urupema

Address: Avenida Nove de Julho, 1037 - Vila Adyana

Phone: +55 12 3921-1599

Email: hotelurupema@hotelurupema.com.br

Single room: R\$ 95,00

Double room: R\$ 120,00

Triple room: R\$ 150,00

Plus 5% tax; Breakfast, parking and Internet included.

Hotel Varanda

Address: Rua Itororó, 206 - Jardim Paulista (close to bus station Nova)

Phone: +55 12 3922-3676

Single room: R\$ 59,00

Double room: R\$ 88,00

Triple room: R\$ 120,00

Breakfast, parking and Internet included.



São José dos Campos (SJC)



São José dos Campos - Banhado

With an estimated population of almost 700.000, São José dos Campos (SJC) is presently the 4th largest city in the state of São Paulo, and the largest and most important in the Paraíba Valley. Its area was first occupied in 1590 by a cattle farm, where today is the borderline between SJC and Jacarei cities. It received the status of town in April 22, 1864 and received its present name in 1871.

SJC is one of the largest industrial and technological centers of the country and the home of well known research centers, such as the Instituto Nacional de Pesquisas Espaciais (INPE), the Comando-Geral de Tecnologia Aeroespacial (DCTA), the Instituto Tecnológico da Aeronáutica (ITA), the Universidade do Vale do Paraíba (UNIVAP), and the Universidade Estadual Paulista "Julio de Mesquita Filho" (UNESP). São José dos Campos is also the home of EMBRAER (Empresa Brasileira de Aeronáutica), the 3rd largest aircraft company in the world, the largest and second oldest GM (General Motors) plant in Brazil, started 1958, and many other technological and electronics industries, totaling more than 700 companies.

Due to its privileged geographical position, between the mountain chains of Mantiqueira and Serra do Mar, SJC is very close to excellent leisure opportunities at the beach or up in the mountains. It is located between the metropolitan areas of Rio de Janeiro (330 km North), in Rio de Janeiro state, and São Paulo (80 km South), the two largest Brazilian cities.



How to get to SJC from São Paulo International Airport (Guarulhos) By Car

From São Paulo International Airport to São José dos Campos take the Rodovia Presidente Dutra (Highway São Paulo-Rio de Janeiro. Distance: 79 Km = 50 Miles) or take the Rodovia Ayrton Senna (Rodovia dos Trabalhadores), drive 65 km and then merge to Rodovia Presidente Dutra driving more 23 km until São José dos Campos-SP (total of 88 km).

By Bus - Company Pássaro Marrom

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Telephone numbers: (011) 6445-2505, 6445-3783 and 6445-3811
(012) 3921-9892

Site: www.passaromarron.com.br

Place: Terminal of Passengers 1 - wing A - Arrival Floor
Terminal of Passengers 2 - wing D - Arrival Floor

Schedule of departures from the Airport to São José dos Campos:

08:00 - 13:00 - 17:15 - 22:00

Schedule of departures from São José dos Campos to the Airport:

06:30 - 10:30 - 15:30 - 20:00

Ticket Price: R\$ 15,00 = US\$ 7,00

By Taxi - Special Taxis

Telephone Number: (011) 6440-7070.

Place: Terminal of Passengers 1 - wing B - Arrival Floor
Terminal of Passengers 2 - wing C - Arrival Floor

Service: 24h00.

Estimated Price: R\$ 200,00 = US\$ 90,00



Venue

The event will be hosted by:

INPE - Instituto Nacional de Pesquisas Espaciais
Av. dos Astronautas 1758 - Prédio CEA Novo
Jardim da Granja - São José dos Campos, SP
12227-010 Brasil

For directions, please have a look at the maps below:

