



**DLIR- Diretoria de laboratorios e
infraestrutura de redes
Laboratories Available in Brazil -
Conformity Assessment and
Interoperability Testing**

Julio Cesar Fonseca - CPqD

Anatel Activities

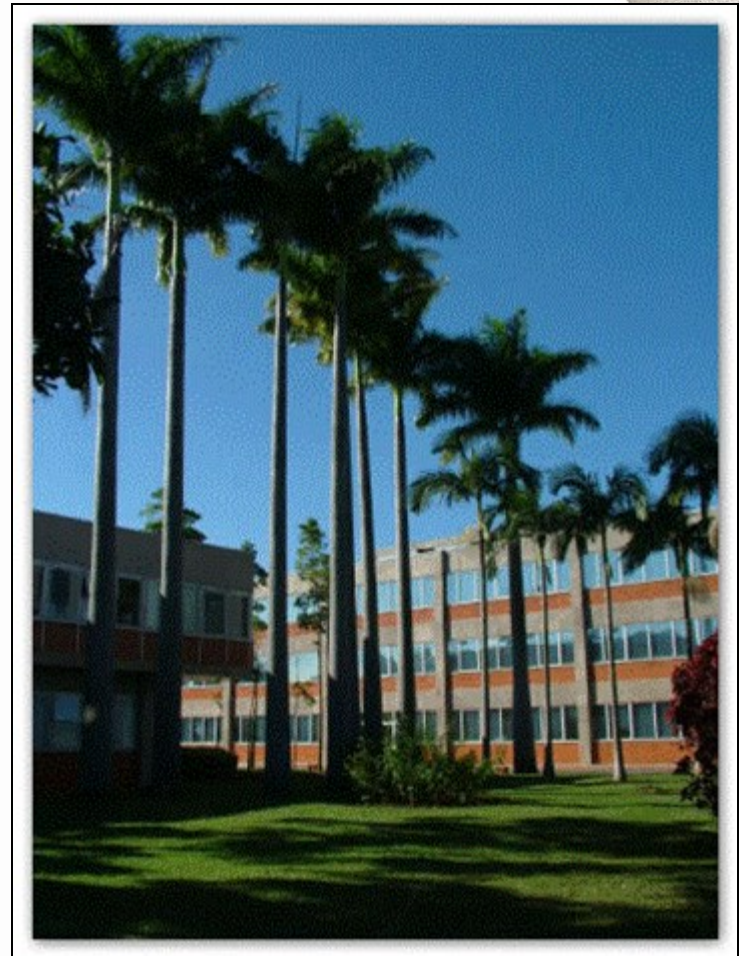
- One of the Anatel's activities is certification and homologation of products and equipments to be used in the Brazilian's telecommunication network
- Today Anatel has 58 technical Resolutions, and use also further international standardization



Products Subject to Homologation (examples)

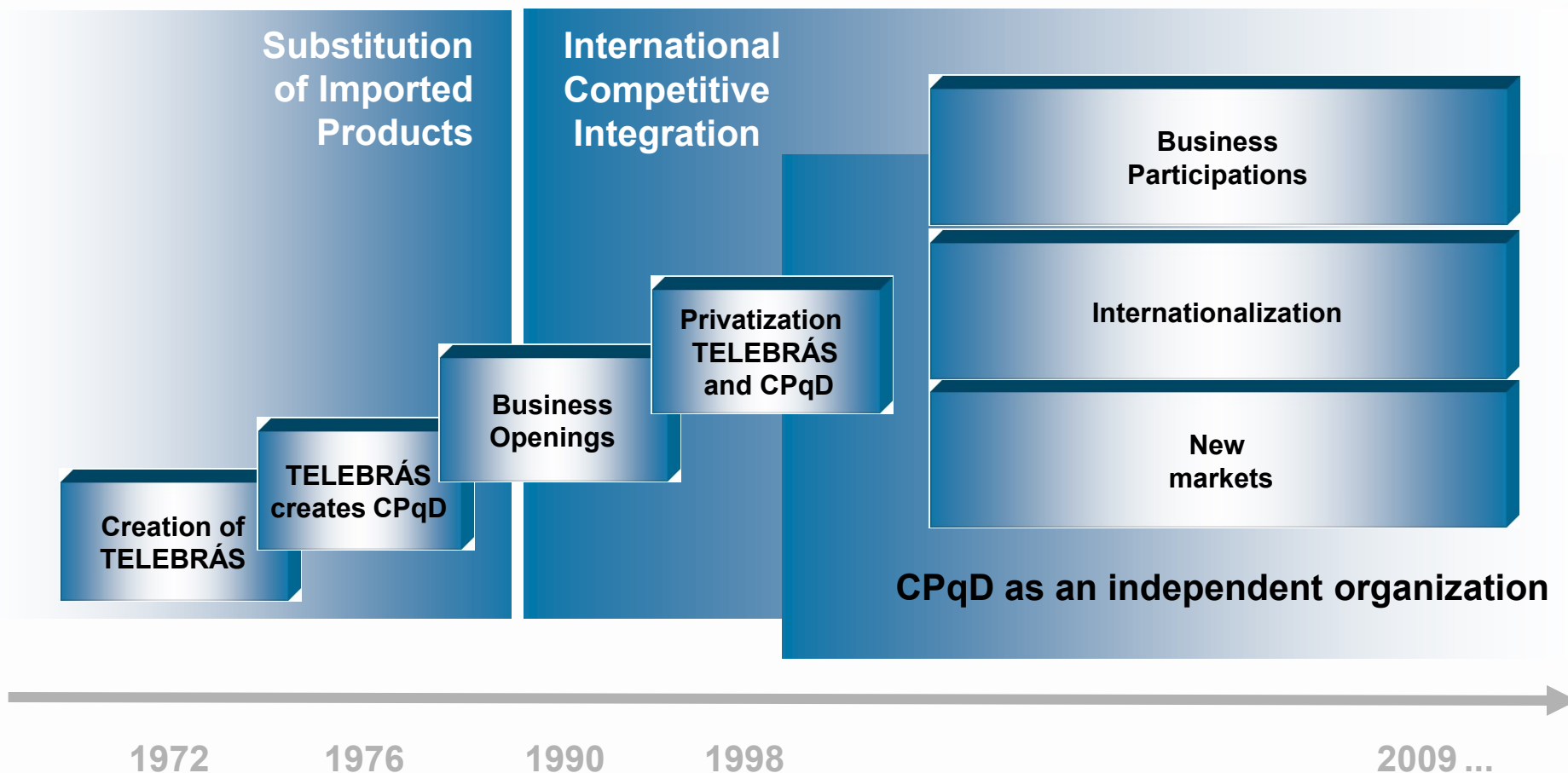
- Battery for Cell Phone
- Charges for Cell Phone
- Inductive Card for Phone Public
- Central Private Switching
- Coaxial Cables
- Cables and optical wire
- Cables for Data Transmission
- Telephone Cable for STFC
- Optical Liabilities Equipments
- Terminals Equipments (modem, CPCTs, etc)
- Stations For Access Terminals
- Telephone Wire
- Modems
- Fixed Phone
- Cell Phone
- IP Terminal Equipment (with wired and Wireless)
- Transceiver
- RF Power Amplifiers
- Antennas
- Equipment (not Broadcasting)
- Lead acid Stationary Batteries

Laboratories for Testing - CPqD

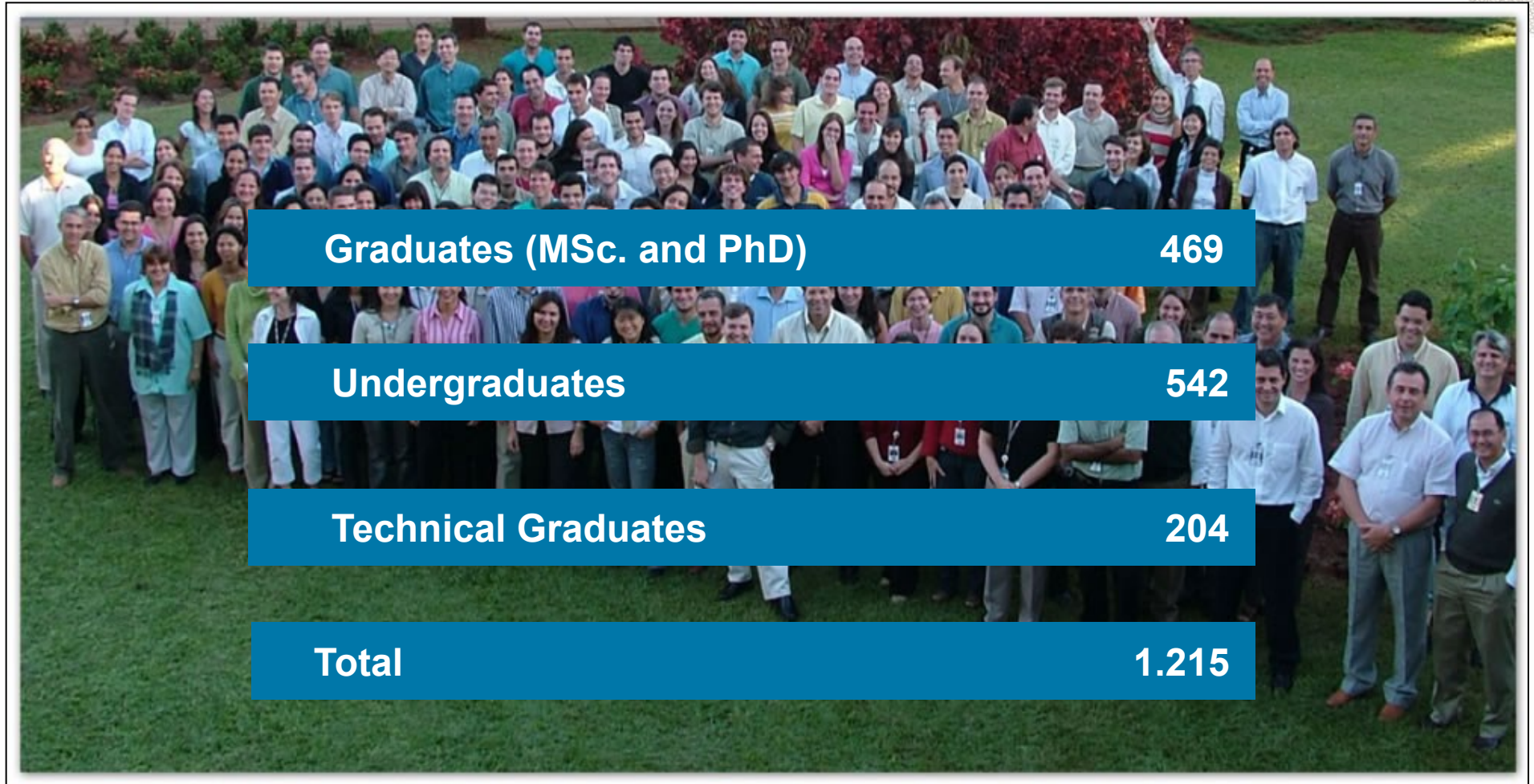


Research and Development
Telecommunications Center

Company History and Evolution



Our Team



Graduates (MSc. and PhD)

469

Undergraduates

542

Technical Graduates

204

Total

1.215

CPqD Laboratories



WIRELESS NETWORKS

TERMINAL EQUIPMENTS

OPTICAL NETWORK

ENERGY – BATTERIES AND POWER SUPPLY

OUTSIDE PLANT

MATERIALS

METROLOGY

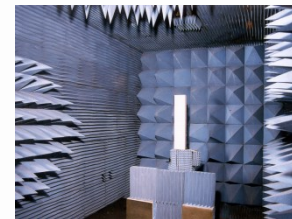
**WIRELESS
NETWORK
LABORATORY**

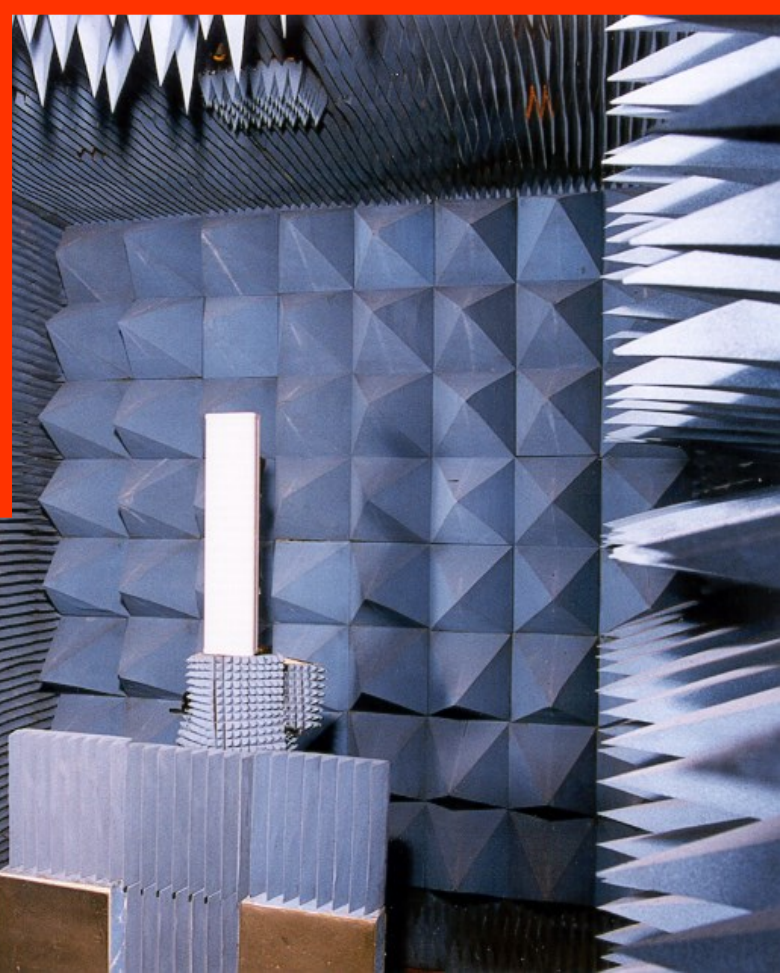
RFID Lab

Radio Systems Lab (RADIOLAB)

Absorption and Dosimetry Lab (LAD)

Antennas Lab





**TERMINALS AND
EQUIPMENTS
LABORATORIES**

Switching and Terminals LAB (LCT)

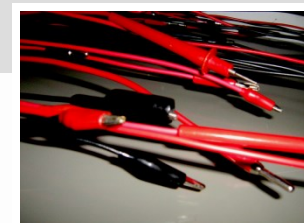
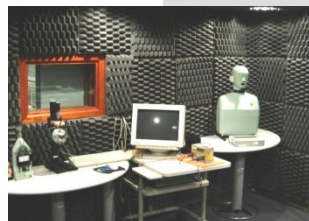
Electrical Tests Lab

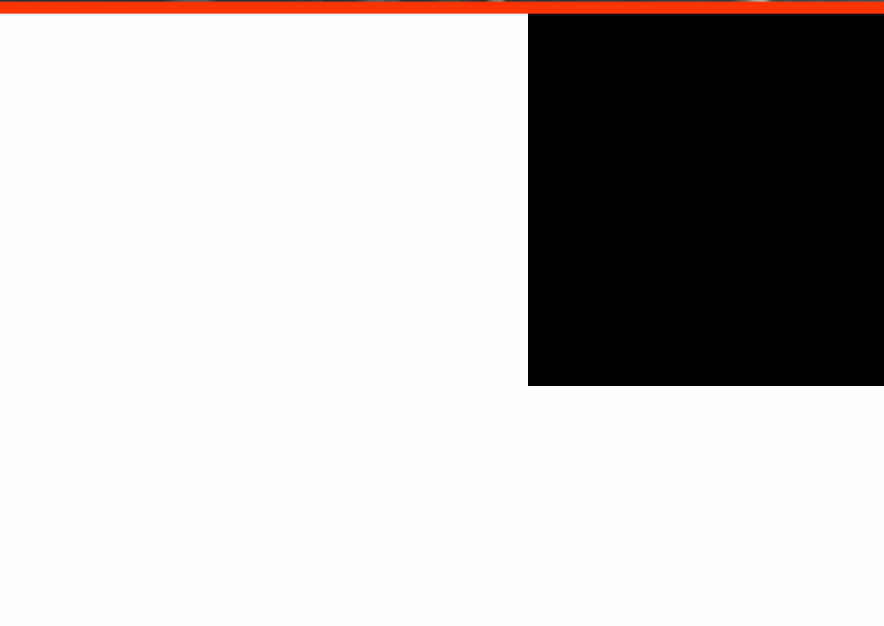
Acoustic Tests Lab

Electrical Safety and Protection Lab

Electromagnetic Compatibility Lab

Power Line Communication Lab





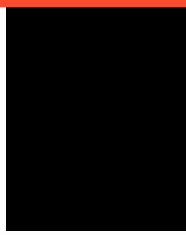
**ENERGY
SYSTEMS
LABORATORIES**

Power Supply Lab

Lead Acid Batteries Lab

Batteries for Cell Phone Lab

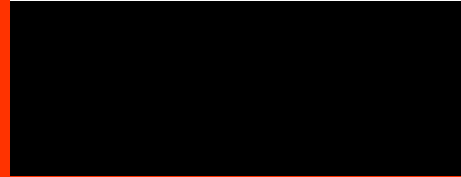




**OPTICAL
PLANT
LABORATORIES**

**Characterization of Optical Fiber and Cables
Accessories for Optical Plant**





**OUTSIDE
PLANT
LABORATORIES**

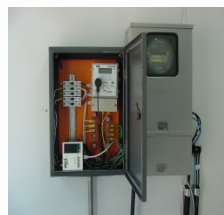
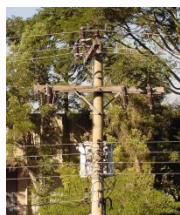
Electrical Characterization

Telecom Copper Pair Cables

Coaxial Cables

Cabinets, Blocks and Connectors

Evaluation of xDSL Pair Cables





**MATERIALS
CHARACTERIZATION
LABORATORY**

Physicochemical Characterization

Mechanical Characterizations

Thermoanalysis and Spectroscopy (FTIR)

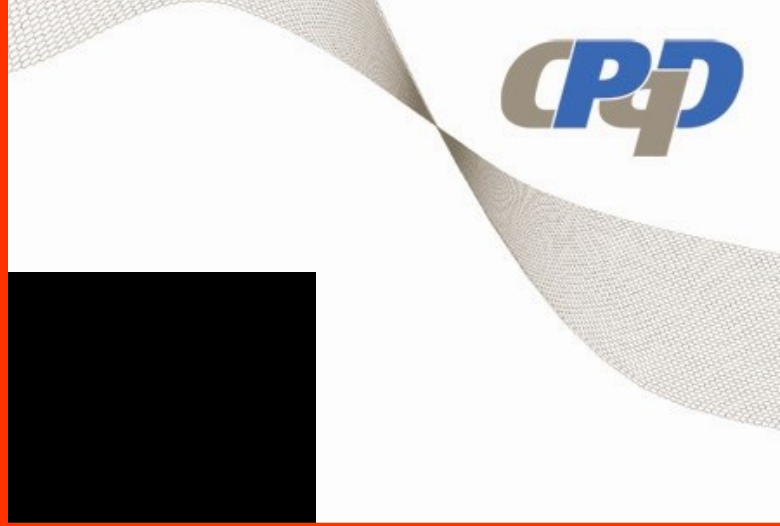
Climatic Tests

Salt Spray

Microscopy:

- **Optical**
- **Scanning electron**





METROLOGY LABORATORIES

Electrical Measurements

Optical Equipments

Time and Frequency

Telecommunications Protocols

Optical Radiation Measurements (displays, monitors, etc.)

Electromedical Instruments





CPqD Accreditations



- **ANATEL: 69 categories of telecom products**

ANATEL – National Agency of Telecommunications

(www.anatel.gov.br)

- **INMETRO: 700 tests**

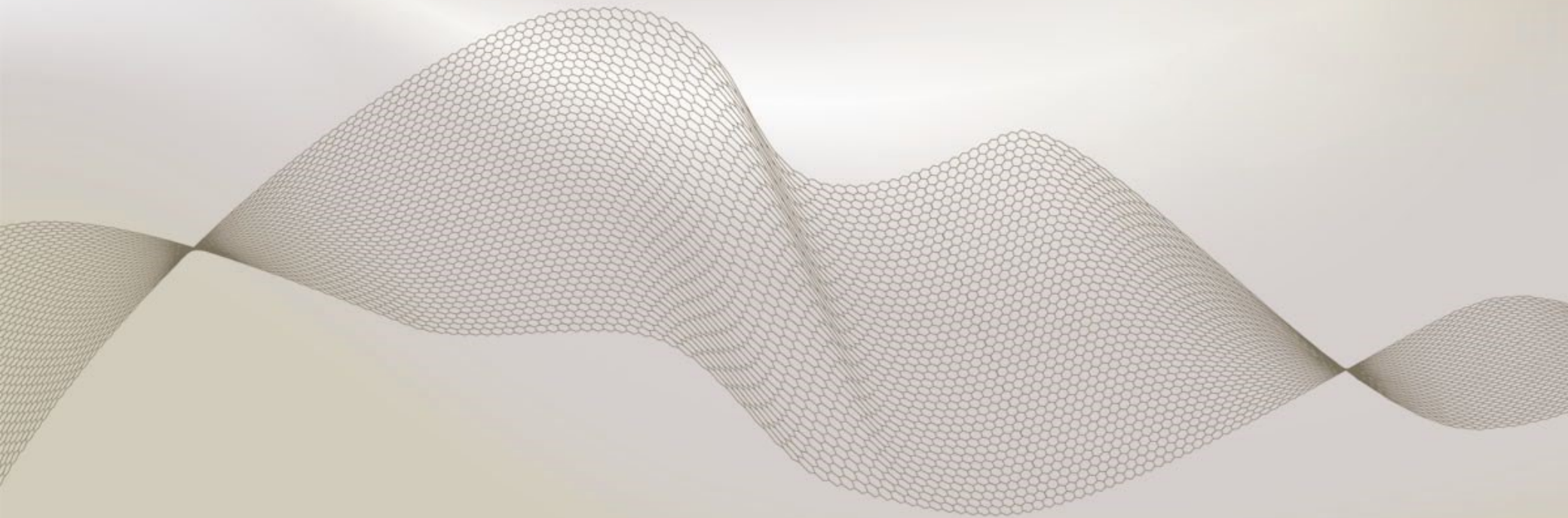
INMETRO – National Institute of Metrology, Standardization and Industrial Quality

(www.inmetro.gov.br)

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