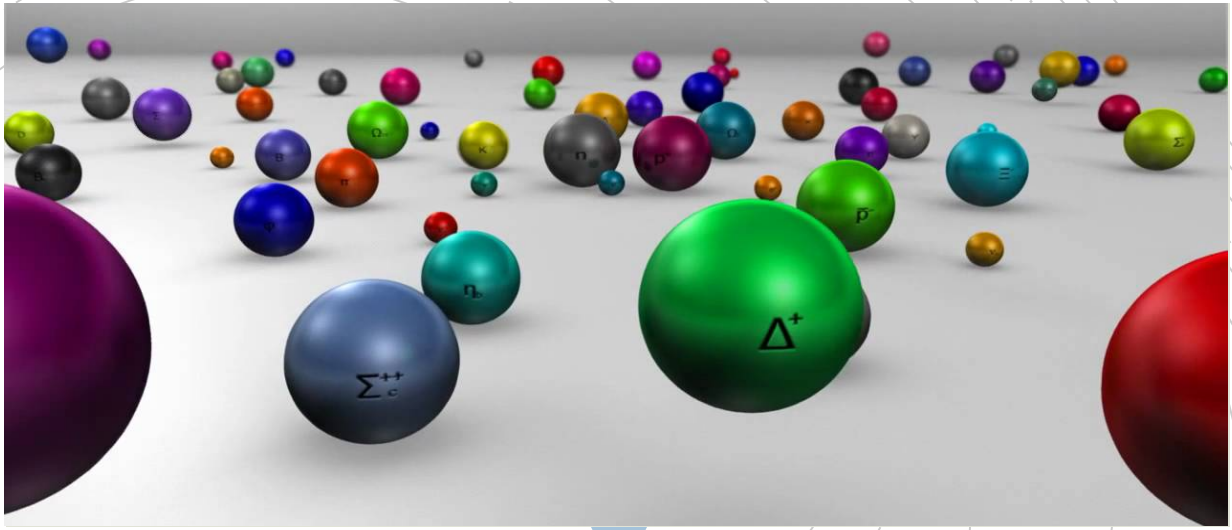
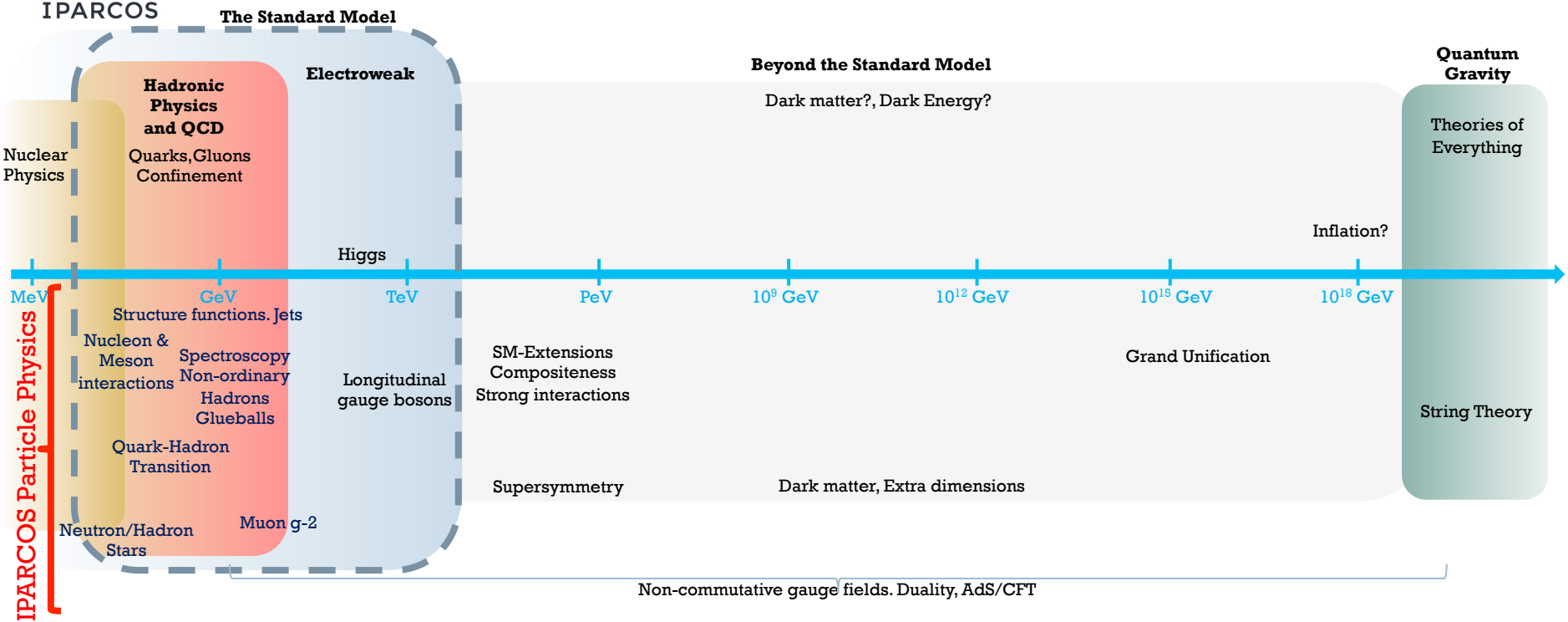
IPARCOS

PARTICLE PHYSICS



Our research covers the whole Particle Physics energy spectrum



The Particle Physics gropus within IPARCOS cover both **phenomenological and formal** aspects.

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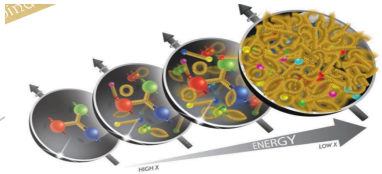

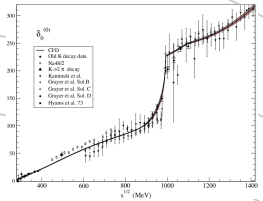

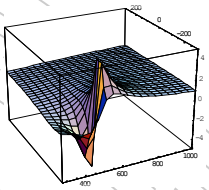

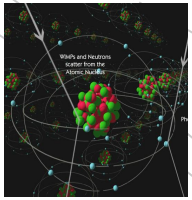

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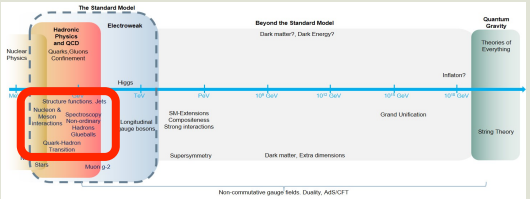
Hadron Physics and QCD:

From low energies to LHC.



- **Research Lines: Mostly Phenomenology**
  - Interactions of Nucleons and Mesons
  - Hadron Spectroscopy. Non-ordinary mesons.
  - Quark-hadron phase transition. High temperature and density
  - Nucleon Structure
  - Tools: Effective Theories. Dispersion Theory
  - Applications to experiments (LHC…).

- **Collaborations:** Spanish Hadron Excellence Network, MIT Jlab, Indiana, Bonn, Bern, Pavía, Regensburg, NIKHEF, Los Alamos, Colombia

- **Members**
  - Profs: A. Gómez Nicola, J.R.Peláez (IP), L. Scimemi (IP).
  - Postdocs: J.M. Alarcón. Soon: R. Molina, V. Matthieu (All Talento Program CAM).
  - PhD: D. Gutiérrez (UCM), S. Leal, A. Rodas (UCM), A. Vioque.

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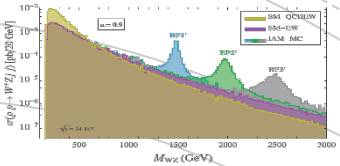

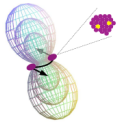

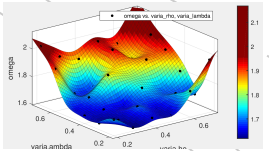

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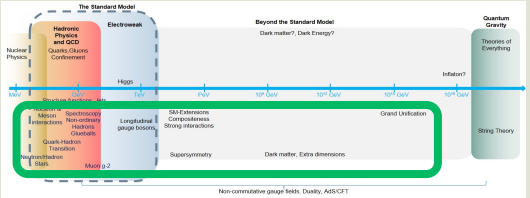
Effective Theories in Particle Physics and Cosmology



- Research Lines: Mostly Phenomenology
  - Higgs Nature. Standard Model Extensions
  - Glueballs and non-ordinary hadrons
  - Quiral Quark Model. Grand Unified Models
  - Neutron Stars, Hadrons at finite density. Equations of State
  - Theory Tools: Effective Theories (ChPT, Electroweak EFT). MonteCarlo Simulations for LHC detection. Unitarization

- Collaborations: Cost action CA16108 (VBScan). Spanish Hadron Excellence Network, CERN, Cape Town,

- Members
  - Profs: A. Dobado (IP), F.J. Llanes Estrada (IP), J.J. Sanz Cillero
  - Visiting Postdoc. A.Guevara (Conacyt-Mexico),
  - PhD: C.A. Quesada (FPI), A. Casado, A. Salas, E. Lope

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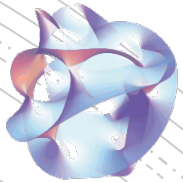
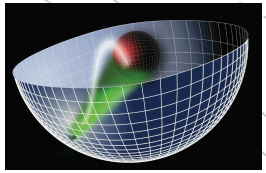
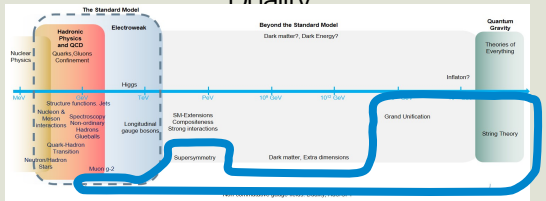




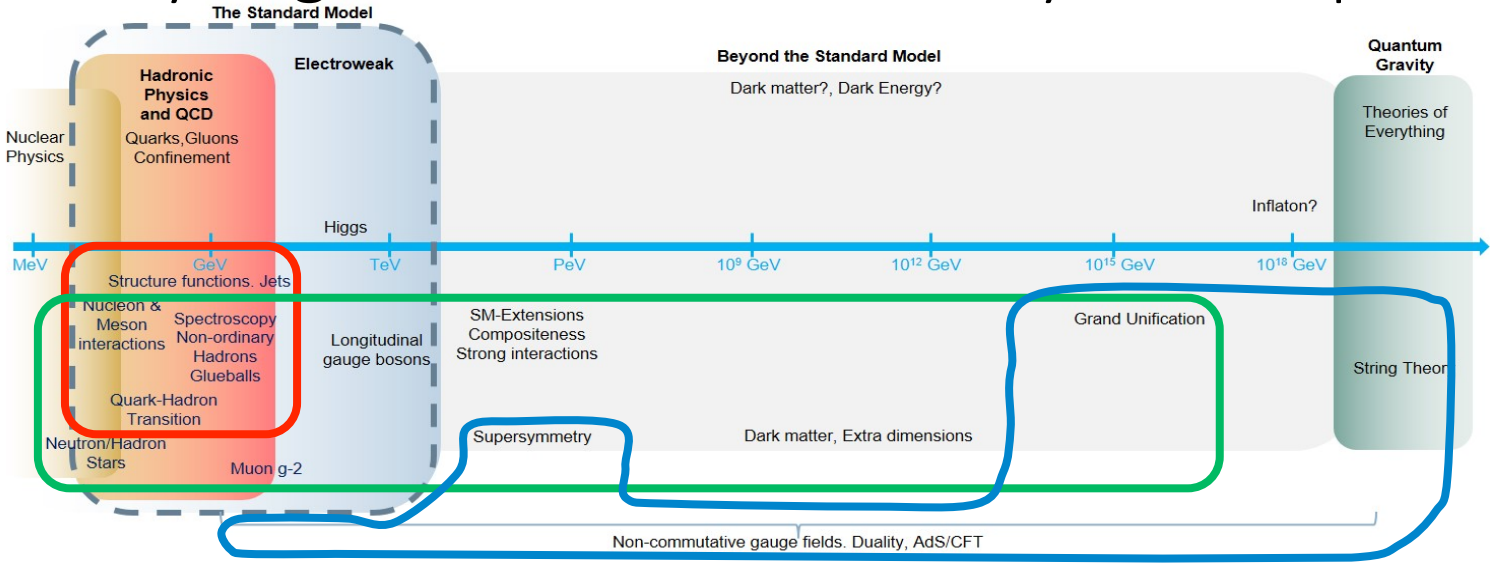
Non-Commutative Fields and Strings:

Scattering Amplitudes and Gauge/Gravity Duality



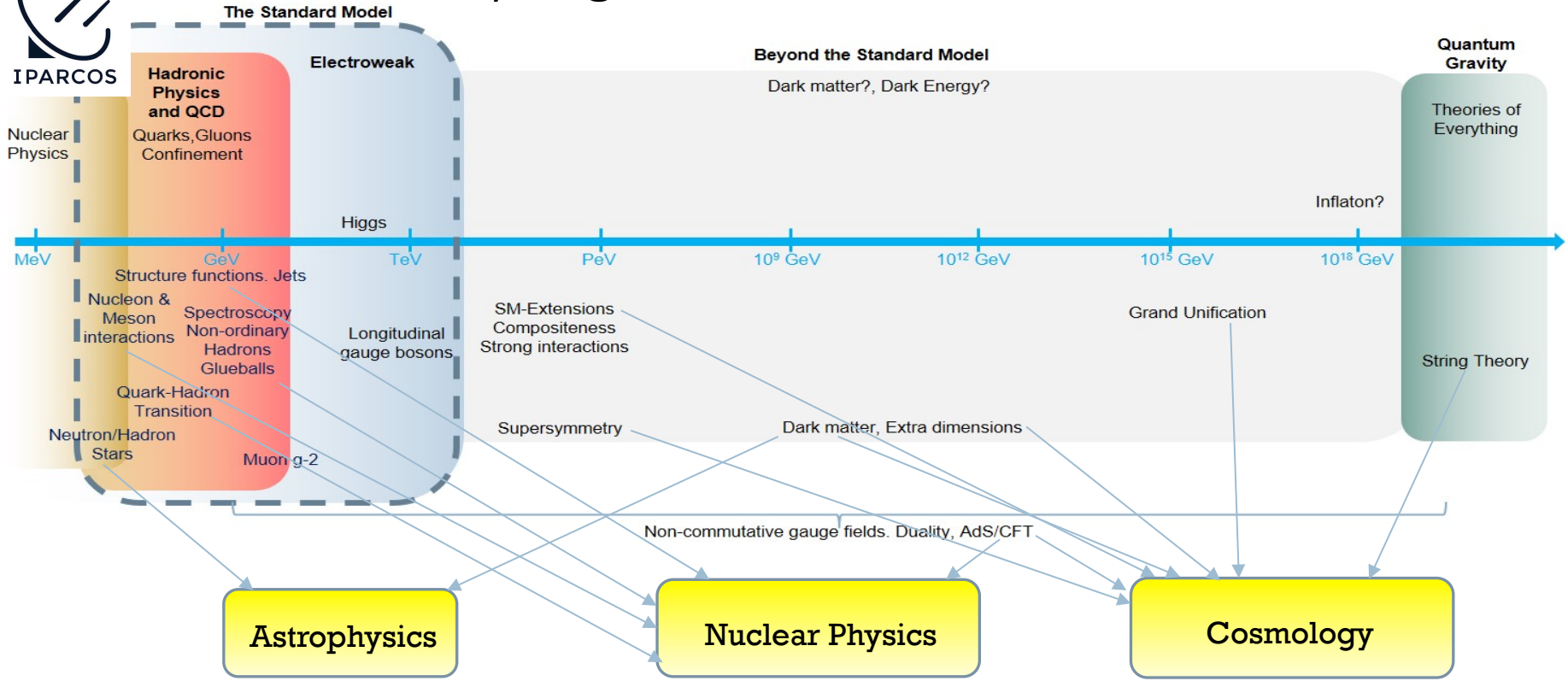
- Research Lines: Mostly Formal
  - String Theory and Supersymmetric Quantum Field Theories
  - Non Commutative Gauge Fields
  - Duality. Integrability and AdS/CFT correspondence
  - Grand Unified Theories
- Collaborations: EU COST ACTION MP1405
- Members in IPARCOS: from FPA2014-54154-P & UCM group "Campos y Cuerdas"
  - Profs: C. P. Martín (IP), R. Hernández
  - Postdoc. J.M.Nieto
  - PhD: R. Ruiz Gil

Synergies within the Particle Physics Groups



- ▢ ▢ Are **already coordinated** research grants:
  - Common Computational cluster
  - Common Journal Club
  - Joint organization of Conferences & Workshops: Hadron2017, QCHSX, QND06, XLVII International Meeting on Fundamental Physics (2018), etc…
  - Same UCM Research Group: "Effective Theories in Particle Physics **and Cosmology**"

Synergies with other IPARCOS lines



Promising prospects of future collaborations within IPARCOS