
NPStrong

Group Composition



Teresa Peña



Ana Arriaga



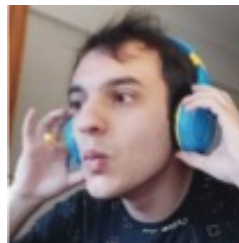
Elmar Biernat



Raúl Torres



Alfred Stadler



André Torcato



André Nunes

Research

Non perturbative functional methods in QCD complementary to lattice QCD applied to Pentaquarks

Hadron spectroscopy

Hadrons on the light front

Problems in the interface of Nuclear/Hadron Physics

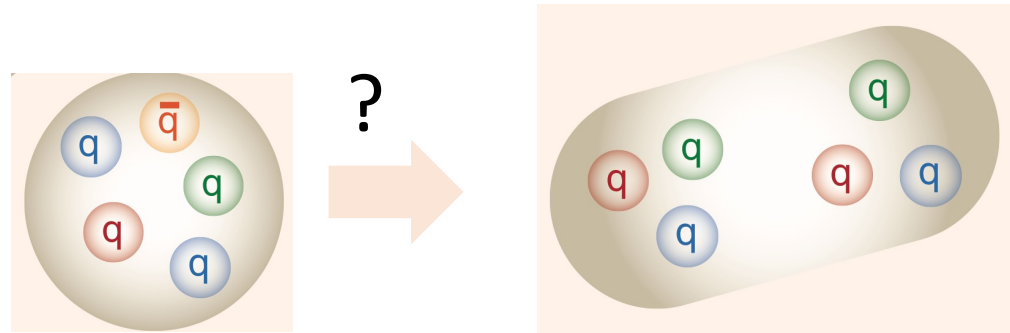


New theoretical methods based on QCD principles are making an old **dream** come true:

To explain hadrons, nucleons and nuclear interaction in a unified manner, as different manifestations of the structure formation of QCD.

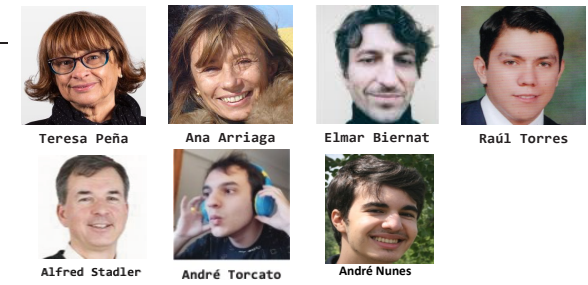
What inspires this dream?

LHCb, Belle, BES III discoveries of Exotic Hadrons that call for interpretation



New computing power and algorithms that are game-changing
FAIR program plans to probe the region of high baryon densities

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Highlights

Invited “Progress Particle&Nucl. Phys.” review on e.m. structure of baryons

TP associate member of HFHF
Helmholtz Forschungsakademie Hesse fur Fair

TP Int. Adv. Com. 3 Intl. Meetings

NSTAR24

FB23

26th European Conference Few-Body Problems in Physics

- 1 Master Thesis completed
- 3 undergraduate trainees
- 2 talks delivered by 1 PhD student

Outreach

EPS Group Physics for development (TP)

EPS Science Forum@Freie Universität Berlin
(TP; Org. Com. + Convener)

Regional Physics Olympics (Évora) (AS)

Intl. Masterclasses on Particle Physics (AS)

“Hands-on hadron physics” 8th Lisbon Mini-School Part. & Astro Physics (EB, AS)

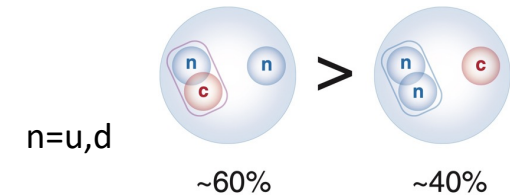
Final Workshop, LIP Internship (EB, AS)

ACHT (Austrian Croatia Hungary triangle) (RT)

“Ciência Viva” event for Secondary School
"Oppenheimer" (TP)

Research

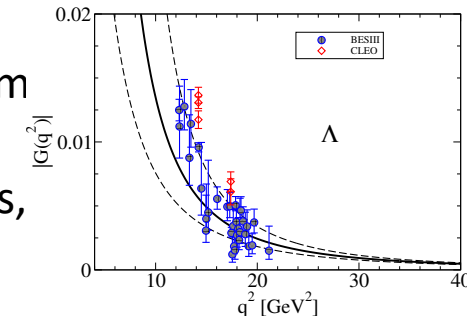
Calculations of structure of singly-charmed baryons Λ_c and Σ_c ,



First results

Deuteron as a six-quark state

Hyperon form Factors
(AstroPhysics, GSI/HADES)



Funding

- 1 CERN-PT project grant
- 1 FCT Computing grant
- 2 Competitive FCT PhD grants

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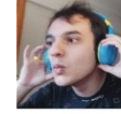
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Strengths

Unique expertise in functional methods

Unified calcs. of hadron properties & multiquark systems from non-perturbative QCD

Complementary toolkits and skills

Intl. Recognition and Collaborations

Opportunities

Physics studies at IST w/ Emphasis on Project Based Learning & Individual learning paths

Access to students from two Departments with Physics Training Programs

Synergies between Nuclear&Particle&Astroparticle Physics

Natural connections to Partons&QCD, NUC-RIA groups

Weaknesses

Reduced dimension

An outstanding researcher obtained a permanent position abroad

Average age of Senior members

Heavy Teaching & Administration load of Senior members