

EPIC 2024

Electroweak Physics Intersections

 22-27 Sept 2024  CalaSerena, Geremeas IT

EPIC 2024 is the first workshop dedicated to **precision electroweak physics**, with focus on:

- Precision tests of the Standard Model and beyond with atomic nuclei
- Lepton- and neutrino-nucleus interactions
- Nuclear matter across energy scales and multi-messenger astronomy

PRE-WORKSHOP SCHOOL

- One-day lectures on precision physics with atoms, neutrino physics, and nuclear EoS in the multimessenger era.
- Dedicated poster session for students at the workshop with teaser-talk event.

SCIENTIFIC PROGRAM COMMITTEE

Sonia Bacca (JGU Mainz)
Matteo Cadeddu (INFN Cagliari)
Nicola Cargioli (INFN Cagliari)
Francesca Dordei (INFN Cagliari)
Mikhail Gorshteyn (JGU Mainz)

EPIC WEBSITE



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LOCATION



ORGANIZED BY



The scope of the workshop

Most precision tests of the Standard Model are done with hadrons and nuclei

Nuclei become prime actors in questions that are asked in the particle physics language

Different communities often only overlap at big conferences with parallel sessions - so even then they may not mingle too much

We picked a few topics where nuclei play an important role: atomic, astro-, particle physics and complemented them with genuine nuclear theory to articulate all relevant questions together

Hence the structure: only plenary talks and location: secluded location to **enforce** encourage interaction

Context: precision physics with atomic nuclei

Precision tests we have in mind:

SM running of the weak mixing angle

W-boson mass

CKM unitarity in the top row

By method of measurement (PVES, APV) neutron skins are related to WMA

To extract weak radius of a nucleus to sub-% precision

—> nuclear charge radii have to be known to a better accuracy

We know them from muonic and electronic atoms + e-scattering

Extraction of radii requires atomic and nuclear theory

Using the radii further (e.g. for corrections to V_{ud}) requires nuclear theory

The workshop model: papal conclave with benefits

Benefits:

No one has to die to justify the meeting

Secluded location = beach resort in Sardinia

All-you-can-eat buffet rather than simple food put through the whole in the wall

No smoke expected at the end of the workshop
Maybe better considering the smoke detectors



The scope of the workshop

This workshop is motivated by a very successful series of MITP workshops (2013 – 2022) so we decided to take the next step

We aim for a lasting effect! 25 out of 64 participants are PhD students who will develop their respective fields in years to come

The school preceding the workshop is thought to give them a pedagogical introduction to adjacent fields

Featured lectures by

Xavi Roca Maza on Nuclear Equation of State from Lab to Stars

Francesco Vissano on Neutrino Physics

Dima Budker on Precision Physics with Atoms

School photo



Structure of the program

Morning sessions 9-11am and 11:30am-12:50pm; Evening session 4:30-6:30pm

All talks 30 min + 10min Q&A

All speakers: please upload your slides to indico the day before!

Discussion 6:30-7:30pm

All speakers: think of ~2 questions you wish to discuss & put them on slides!

Discussion leaders Monday: Maxim Pospelov, Thursday: Vladimir Pascalutsa, Friday: The organizers

Lunch 12:50-2pm + free (beach) time till 4pm coffee break

If you prefer a lunch box: tell to reception or (better) maitre d' the day before

Dinner 7:30-9pm (Tuesday until 9:30pm because the poster session ends later)

Tuesday: shorter evening session + Poster Jamboree (5:50-6:50pm) + Poster Session (6:50-8:20pm)

Poster session and jamboree organizer: Nicola Cargioli

Wednesday: shorter lunch (till 2pm) + Excursion (Bus transfer from Calaserena at **2pm**)

Friday: short day ended with discussion

Social Activities

- * Beers, Snacks & Posters: **Tuesday**, Sep 24, 6:50pm
- * Excursion to Barumini Nuraghe Archeological Site + Aperitivo: **Wednesday**, Sep 25, 2-7pm
Departure at 2pm from reception
If you decide to skip the excursion please tell us today!
- * Social Dinner at Ristorante “La Brezza” (downstairs)
Thursday, Sep 26, 8:30pm
They should ask for any allergies and dietary preferences
Poster/Jamboree talk prizes announcement
- * Long lunch breaks for any kind of activities (sports, swimming pool, beach, spa, ...)
Daycare + animation for children (check with the hotel)
We have EPIC umbrellas/beach chair reserved on the beach



Sponsors

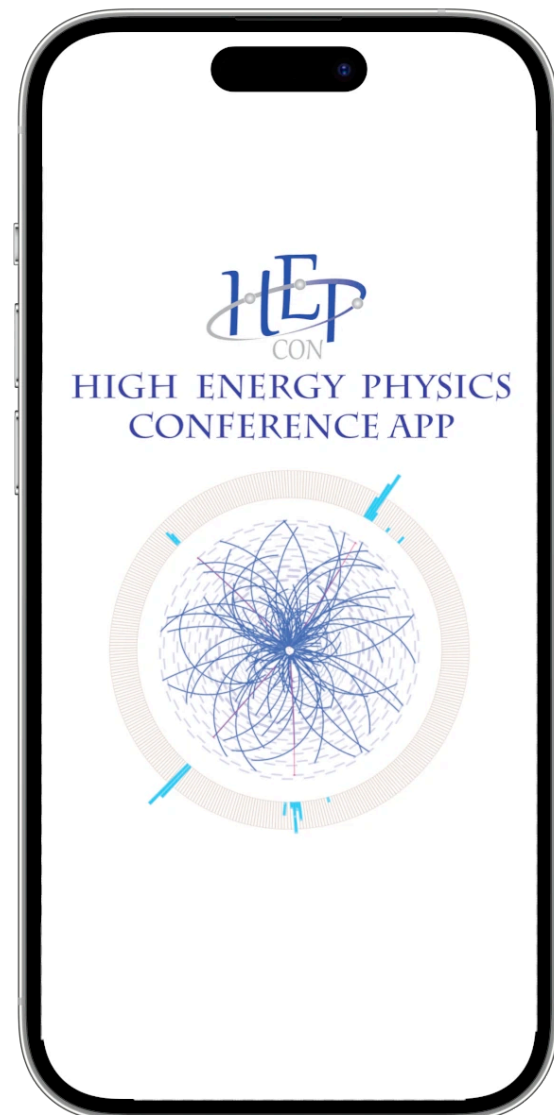
ExtreMe Matter Institute



Mainz Institute for Theoretical Physics



Istituto Nazionale di Fisica Nucleare (INFN)



HEPCon App

Mobile Conference App
by Martin Vassilev

Local Organization

Kassiopea Group



Welcome to Sardinia

and

Let the EPIC begin!