TWEPP-24

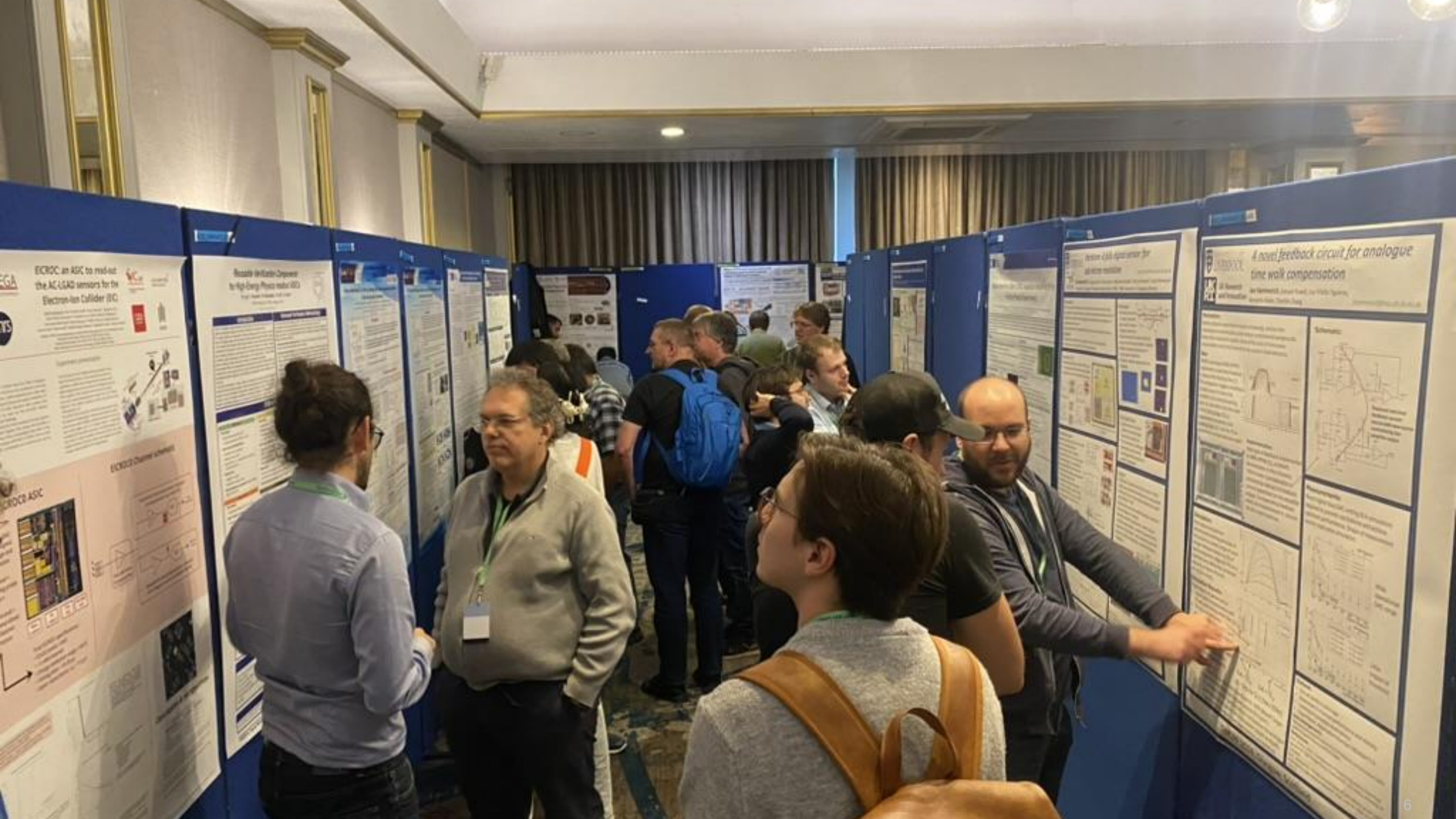
Topical Workshop on Electronics for Particle Physics

Glasgow, United Kingdom, 30 September – 4 October 2024

A. Kluge

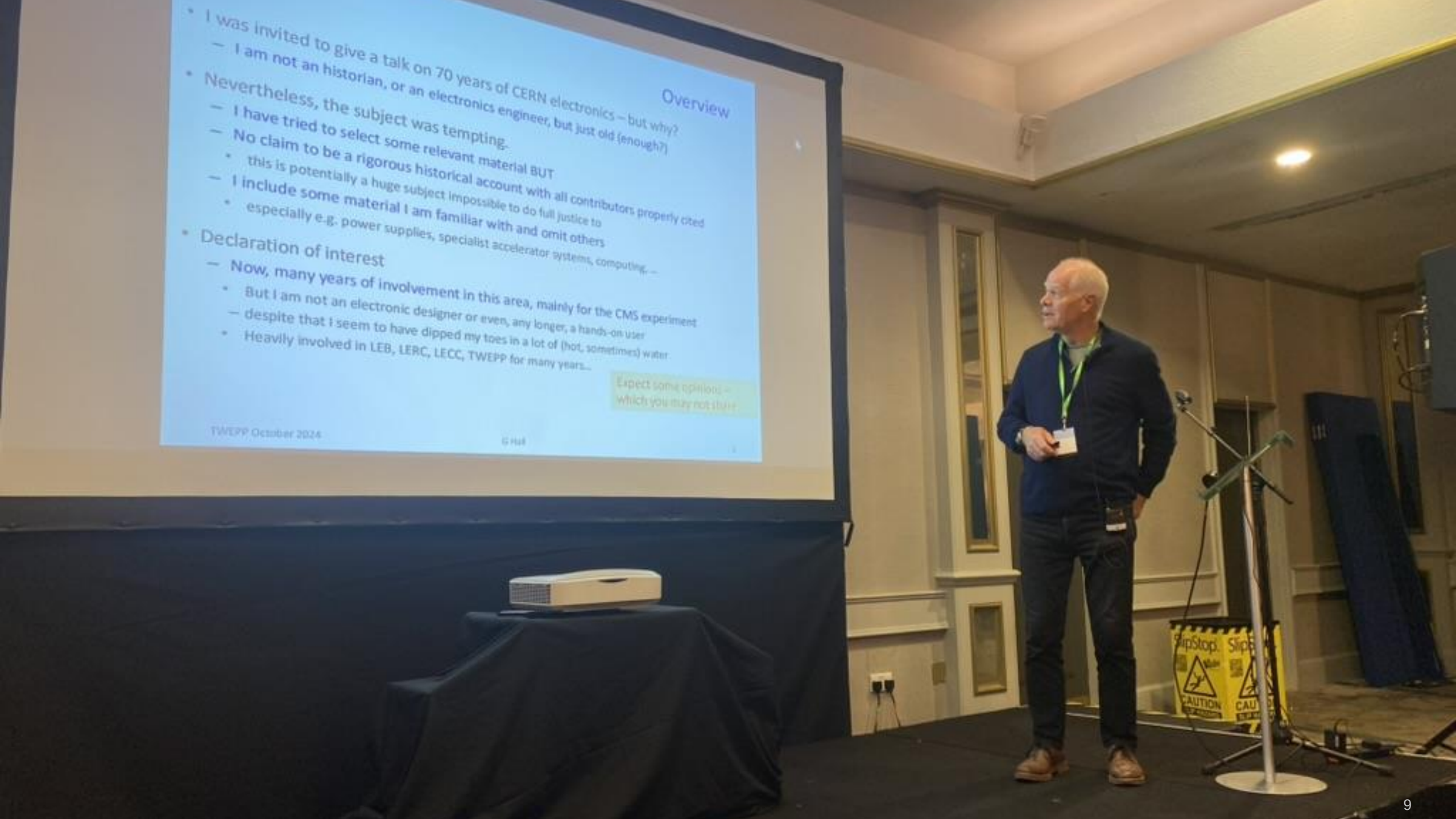
Workshop organization & venue

A. Kluge


EICROC an ASIC to read-out the AC-LGAD sensors for the Electron-Ion Collider (EIC)
A novel feedback circuit for analogue time walk compensation


CAEN
GarnerOsborne
Leading UK specialists in
all under one roof.
samtec
HIGH-SPEED
CABLE SYSTEMS
samtec


Geography
• % of UK landmass
• 790 islands
• Space - 10% of UK population
• Highland Boundary Fault
• Munros & Lochs
• Central Belt – Flatter & peopled
• Natural Resources
SCOTLAND
Scotland
England


Overview
I was invited to give a talk on 70 years of CERN electronics – but why?
I am not an historian, or an electronics engineer, but just old (enough?)
Nevertheless, the subject was tempting.
I have tried to select some relevant material BUT
No claim to be a rigorous historical account with all contributors properly cited
this is potentially a huge subject impossible to do full justice to
I include some material I am familiar with and omit others
especially e.g. power supplies, specialist accelerator systems, computing, –
Declaration of interest
Now, many years of involvement in this area, mainly for the CMS experiment
But I am not an electronic designer or even, any longer, a hands-on user
despite that I seem to have dipped my toes in a lot of (hot, sometimes) water
Heavily involved in LEB, LERC, LECC, TWEPP for many years...
Expect some opinions – which you may not share
TWEPP October 2024
G Hall
CAUTION

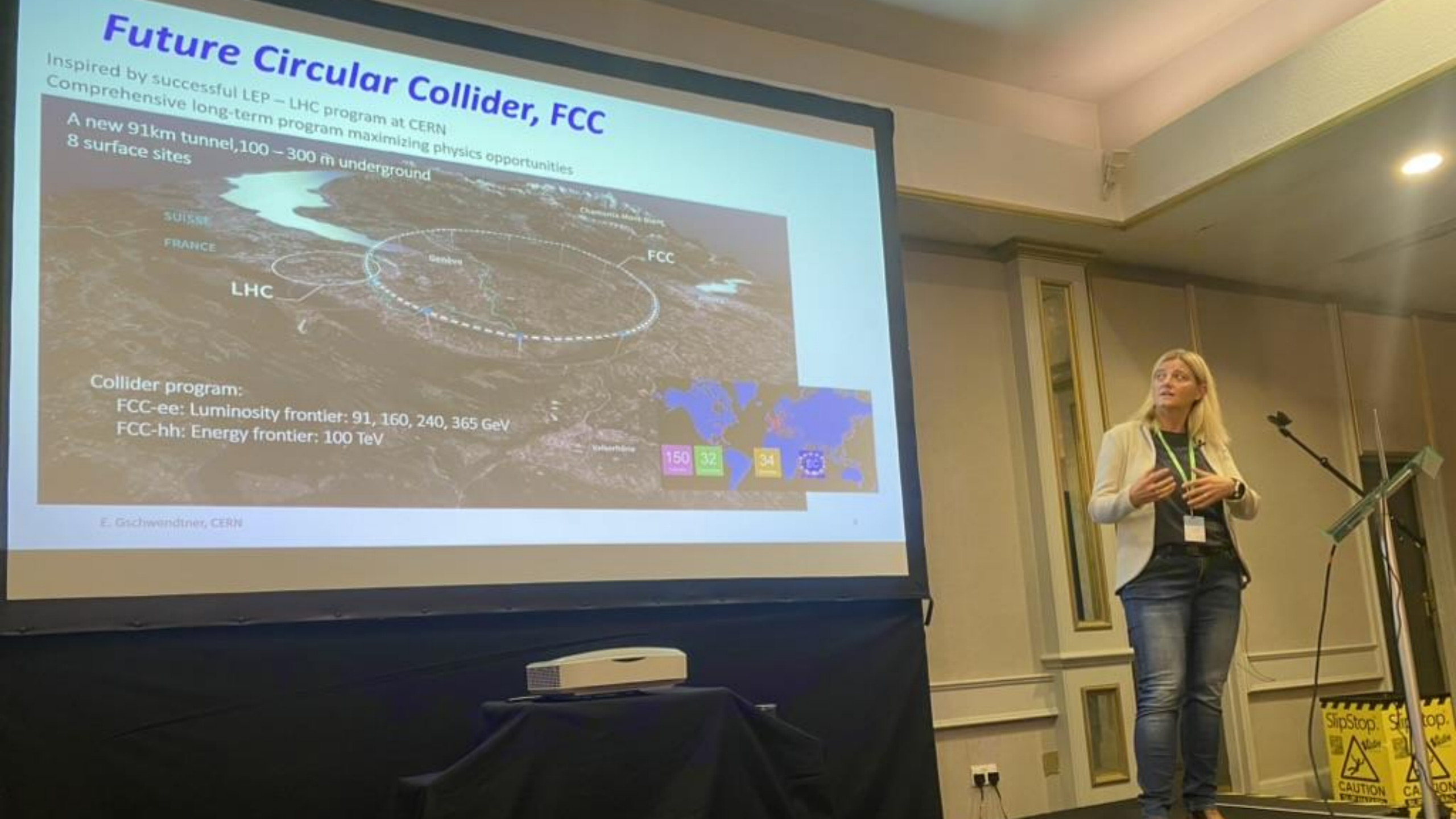
Future Circular Collider, FCC

Inspired by successful LEP – LHC program at CERN
Comprehensive long-term program maximizing physics opportunities

A new 91km tunnel,100 – 300 m underground
8 surface sites

Collider program:
- FCC-ee: Luminosity frontier: 91, 160, 240, 365 GeV
- FCC-hh: Energy frontier: 100 TeV

E. Gschwendtner, CERN




University of Glasgow
Quantum Technology for Sensing & Timing Applications
Prof Douglas J. Paul
Royal Academy of Engineering Chair in Emerging Technologies


AUCHENTOSHAN
SINGLE MALT SCOTCH WHISKY
AUCHENTOSHAN
SINGLE MALT SCOTCH WHISKY


ELIZABETH CAMERON


Opening times


Scotland's Wildlife
Environment Discovery Centre
Looking at Art
Art Discovery Centre


24

Local and scientific committee

Local organisation

R. Bates (University of Glasgow, UK)
A. Blue (University of Glasgow, UK)
D. Maneuski (University of Glasgow, UK)
S. Naik (University of Glasgow, UK)
K. Walkingshaw Pass (University of Glasgow, UK)

Scientific organisation

A. Kluge (CERN, CH, Chair)
J. Alme (UIB, NO)
S. Baron (CERN, CH)
R. Bates (University of Glasgow, UK)
A. Boccardi (CERN, CH)
H. Chen (BNL, US)
S. Danzeca (CERN, CH)
C. Fernandez Bedoya (CIEMAT, ES)
M. French (RAL, UK)
D. Gascon (UB, ES)
P. Gui (SMU, US)
M. Hansen (CERN, CH)
C. G. Hu (IPHC-IN2P3, FR)
G. Lehmann Miotto (CERN, CH)
D. Maneuski (University of Glasgow, UK)
A. Ricci (CERN, CH, Secretary)
A. Rivetti (INFN, IT)
W. Snoeys (CERN, CH)
F. Vasey (CERN, CH)
K. Wyllie (CERN, CH)

Tutorial

Tutorial

- Cadence
  - **Signal integrity optimisation**
    - via simulation of the integrated circuit, PCB, connector, cable and system level
      - Electrical thermal co-simulation at PCB/IC package leve
      - Optimisation of EMC at PCB/IC package level
      - Design of robust power supply network at PCB/IC package level
      - Simulation of DDR routing at PCB/IC package level
      - Simulation of High-Speed serial link routing at PCB/IC package level
      - Analysis of a complete system – PCB/package/connector/cable
  - https://indico.cern.ch/event/1381495/page/32655-tutorial
  - **If you are interested but have not registered, please tell us now**

Oral Presentation award

Oral presentation awards

- Oral presentation award
- Friday, October 4, 11:10
- Referees
  - TWEPP scientific committee

- 15 Optimized Rad-Hard DC/DC Converters for HEP Applications
- 20 Yield Characterisation and Failure Analysis of the Monolithic Stitched Sensor MOSS for ALICE ITS3
- 34 Next generation fully integrated DCDC converters for HEP applications in 28nm technology
- 46 3D Integration of Pixel Readout Chips using Through-Silicon-Vias
- 56 Power distribution over the wafer-scale monolithic pixel detector - MOSAIX for ALICE ITS3
- 63 Silicon Photonics Circuits for the optical readout of CERN detectors
- 71 Performance tests and hardware qualification of the FEBs for the novel Super-Fine Grained Detector of T2K Phase II
- 112 The services chain for the upgrade of the Inner Tracker Pixel detector of the ATLAS experiment – full services from pixel modules to optical readout for the Outer Barrel sub-system
- 120 Development of the MOSAIX chip for the ALICE ITS3 upgrade
- 132 Applications of PixESL framework on pixel detectors for High Energy Physics experiments
- 135 Development of a novel low-mass module flex PCB using nano-wire-based flip-chip interconnection
- 165 Technical challenges designing a prototype common readout board for LHCb future upgrades
- 172 Design and characterization of the monolithic ASIC for the pre-shower upgrade of the FASER experiment

Proceedings

Proceeding recommendations

- Describe specifications and implementation challenges arising from these specifications
- Use quantitative (numbers) statements, comparisons and performance figures
  - and do not give statements that a given parameter needs to be high or low
- Limit introduction to relevant information to work you describe in the paper
  - Repetition of standards phrases about the LHC luminosity upgrade might only be useful if information is set in direct context to your work
- Describe work/challenge/complexity so that it can be understood by a scientist outside your field of competence
  - in contrast to writing an experiment collaboration note
- Describe why your work is worth being presented at a scientific/technical workshop
- Describe challenges/difficulties during implementation and how they were solved or why not
- Check quality of formatting, language, style and length

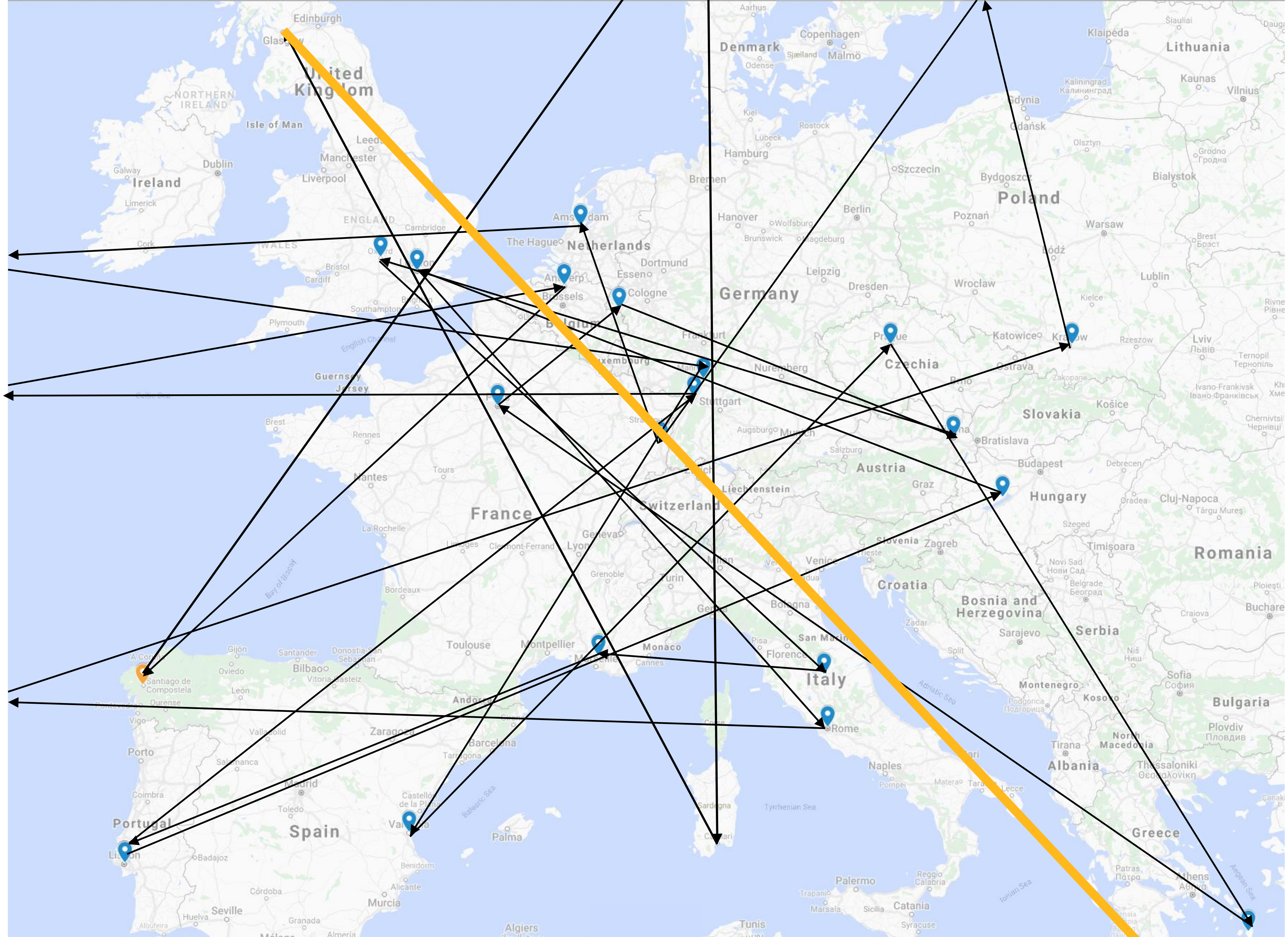
Proceedings

- **JINST - https://jinst.sissa.it/jinst/**
  - **submission using JINST web based infra structure**
  - **organized as non-open access, no cost for author**
    - JINST offers open access, cost would need to be covered by author/institute/experiment
    - or author institute has agreement with JINST
  - **each paper assigned to 2 referees**
    - from TWEPP scientific committee
- **Length**
  - **number of pages must not exceed 5 pages**
    - **(excluding the title & abstract page & references)** for both oral and poster contributions
- **Deadline November 3, 2024, 23:59 CET → no extension**
- **Instruction to authors**
  - **TWEPP web page**
    - https://indico.cern.ch/event/1255624/page/28781-proceedings-instruction-for-authors
  - **review will be strict**
    - 2 rounds of review
      - do not waste 1 round with insufficient formatting, structure, writing style or length

Questionaire

- https://indico.cern.ch/event/1381495/manage/surveys/5175/questionnaire/

TWEPP25



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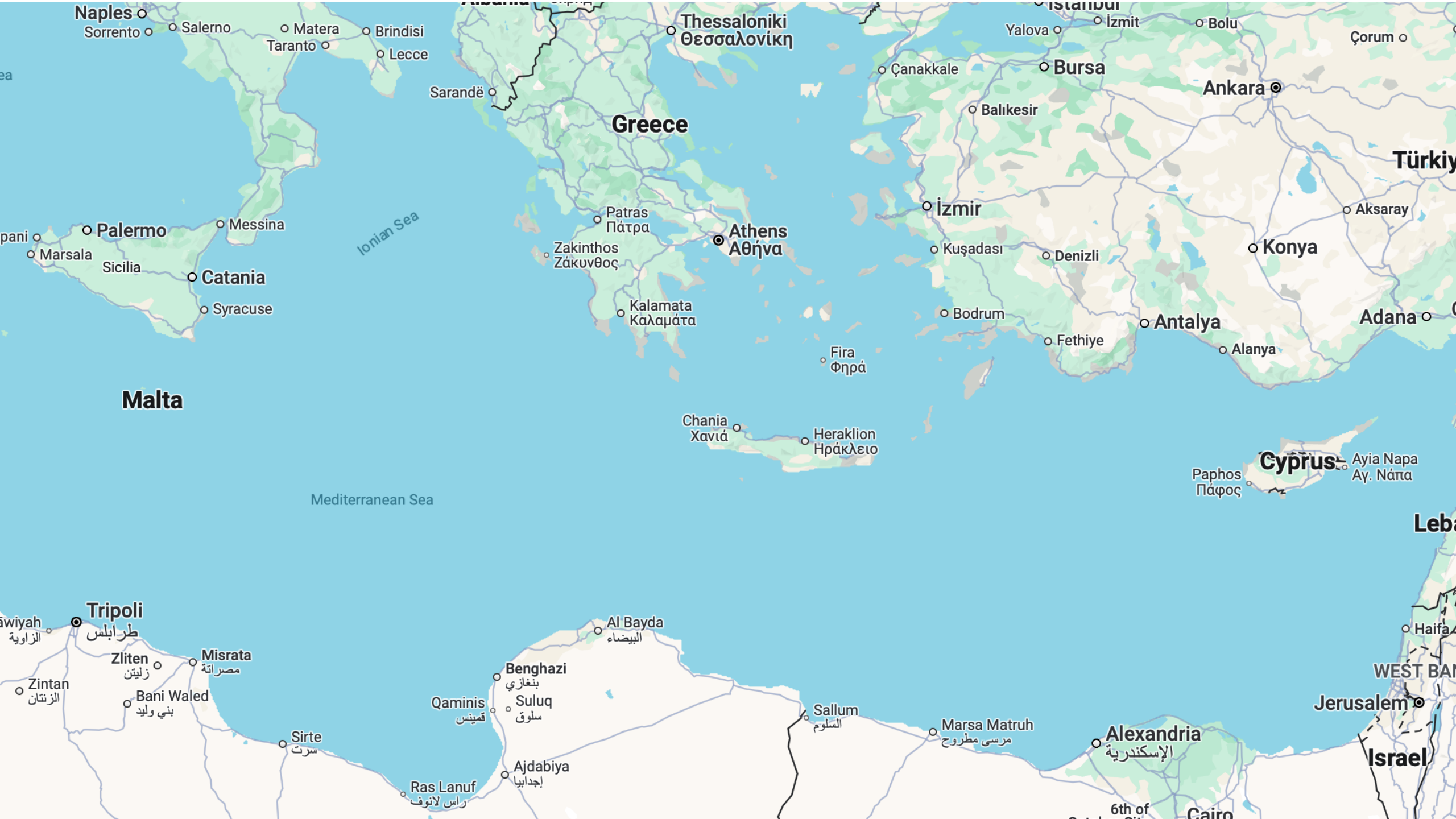
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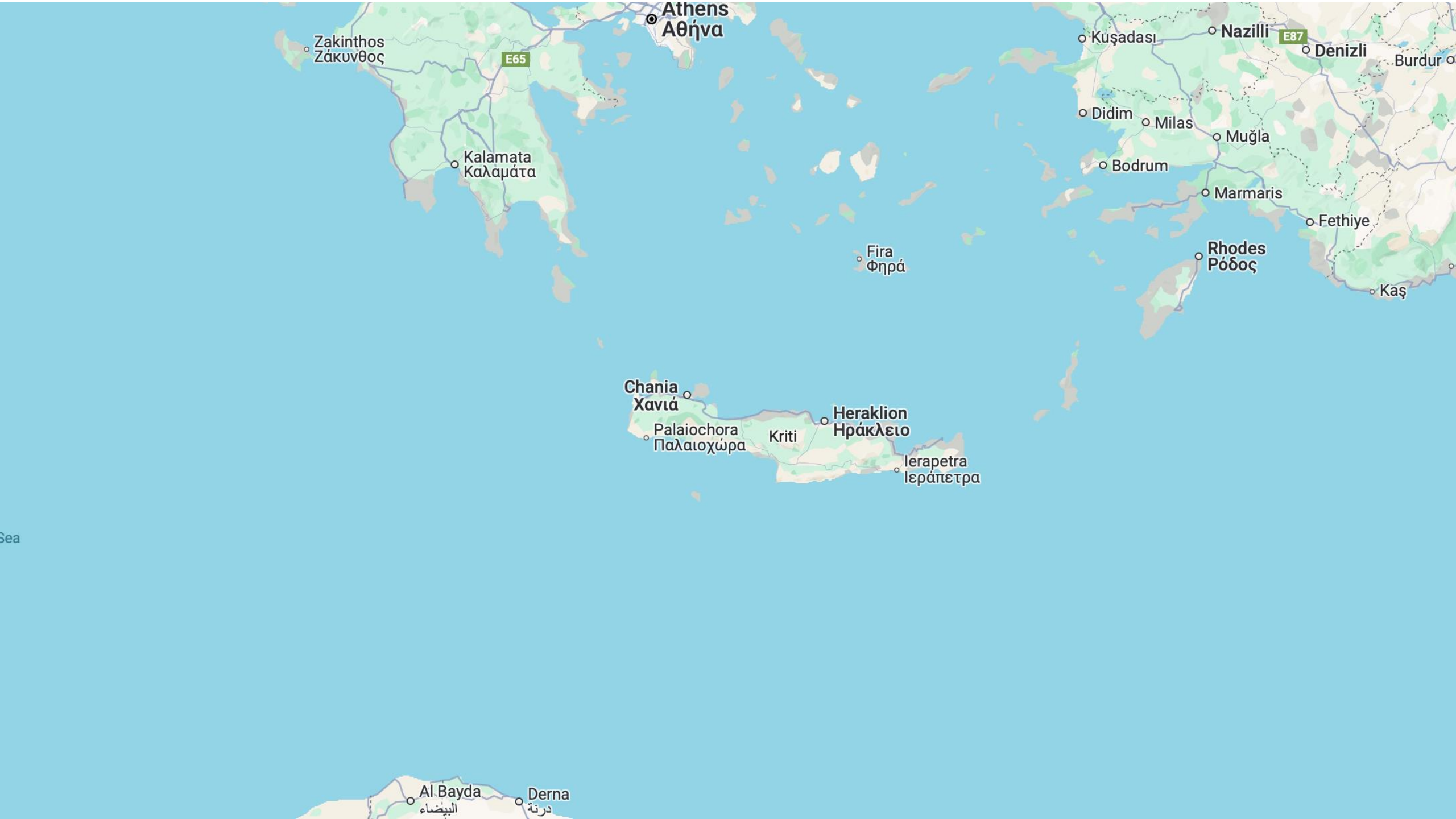
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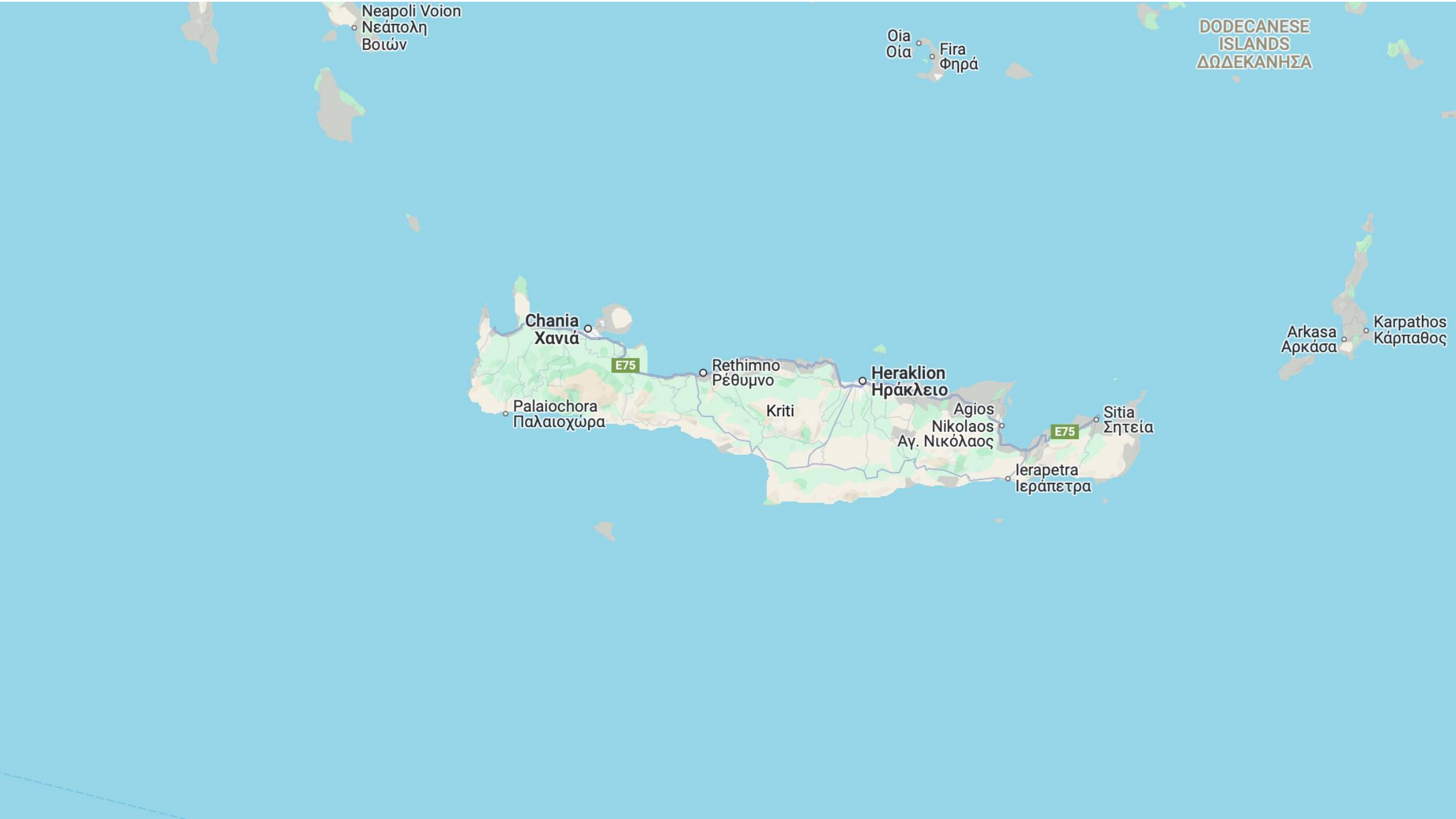
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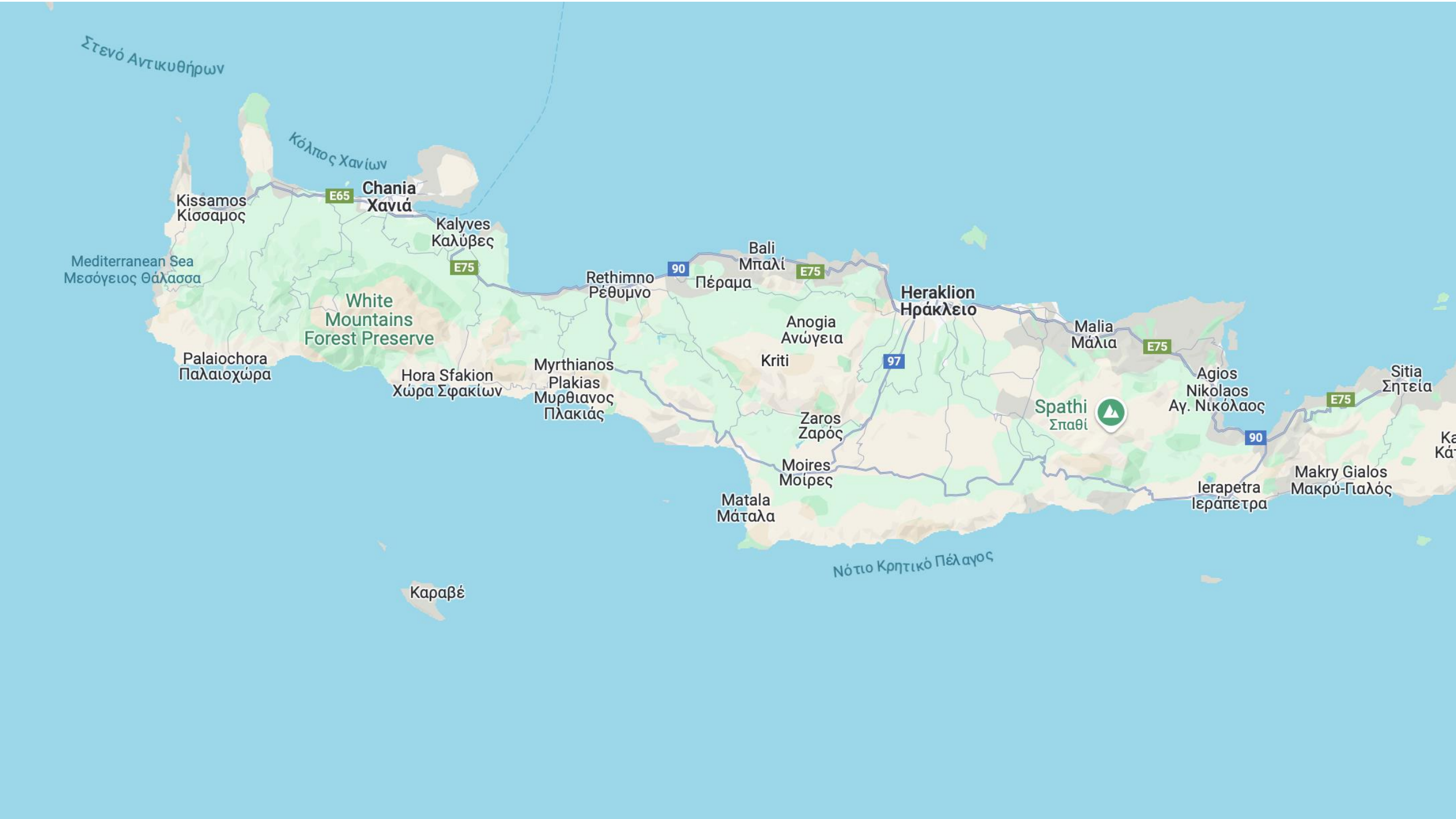
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Ιεράπετρα
Makry Gialos
Μακρύ-Γιαλός
Νότιο Κρητικό Πέλαγος
Καραβέ

We are looking forward to seeing you in Crete
6.10 – 10.10.2025