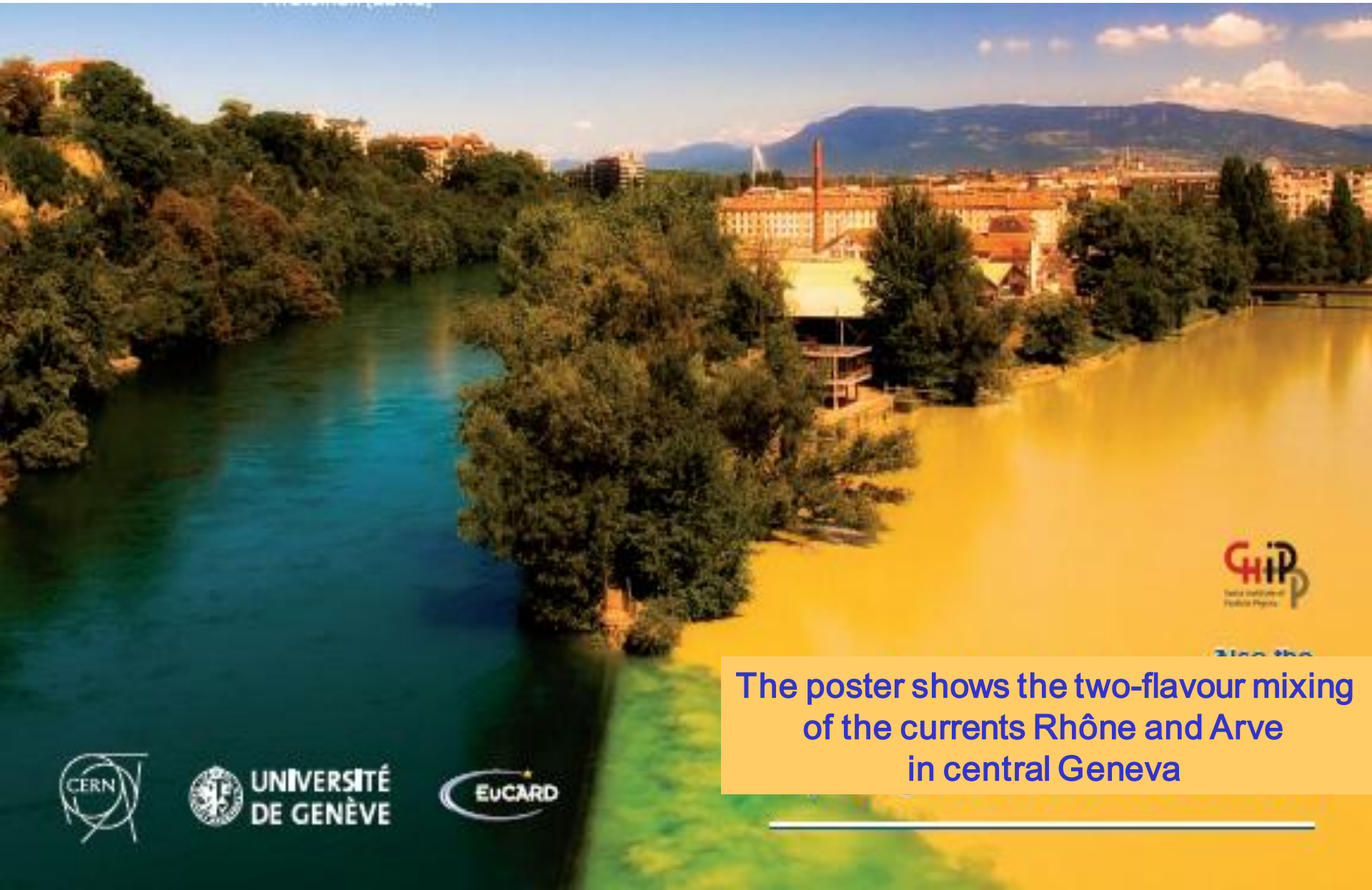
GOALS OF NUFACT11 WORKSHOP



The poster shows the two-flavour mixing of the currents Rhône and Arve in central Geneva

GENERAL AIM:

CLARIFY VISION OF NEXT STEPS
FOR ACCELERATOR-BASED NEUTRINO FACILITIES

Tool:
-- Questions prepared from last year + Program Committee
-- Questions that will be asked to and by round table members today

MANY THANKS
TO PROGRAM COMMITTEE and WG CONVENERS
for preparation of program + questions!

PHYSICS QUESTIONS → WG1

QUESTIONS FROM THE SPC (= Ourselves):

1. Sensitivity and optimization studies.
   Please compile from FEASIBLE projects
   (i.e. eliminate high gamma beta beams from the plots)

1'. Express sensitivities in term of **error on parameters**

INSIST ON LARGE θ_{13} REGION!

2. NSI: Write down a consistent model that gives observable non-standard neutrino interactions.

4. TAUS Provide statement on precision that is interesting for measurements of $\nu_\mu \rightarrow \nu_\tau$ and $\nu_e \rightarrow \nu_\tau$ oscillation measurements.

4'. Report on studies of such measurements for superbeam and neutrino factory.

5. UNIVERSALITY More generally explicit what testing universality of 3x3 mixing matrix means?
limits on 4th family neutrino or sterile neutrino?

3. BROAD PICTURE

Provide physics motivation of LBL oscillations
within wider context of particle physics, beyond a relatively small (compared to the scale of the facility) neutrino aficionados circle.

7. LHC Is any LHC physics search or discovery able to shed light on the neutrino paradigm?

Neutrino scattering/near detector Questions (WG II)

1. The puzzle of CCQE cross-section found by MiniBooNE:

1.1 Disagreement versus NOMAD

1.2 Disagreement CC/NC versus SciBooNE

1.3 Disagreement versus theoretical models

2. Measurements *(with sufficient precision)*
of cross-sections for oscillation signal ?
ex: ν_e in ν_μ beam for super-beam -- and vice versa for beta-beam

2.1 Measurement of cross-sections for electron and muon neutrinos
with the present generation of near detectors and beams

2.2 What rates can be achieved at a mini-neutrino factory
(e.g. Antiproton accumulator at Fermilab etc..)
and possible precision measurement of ν_e and ν_μ cross-sections?

2.3 near detectors for future projects (DUSEL, CERN-LBNO, T2O etc…)
-- can liquid Argon be used as near detector?

(ex. in PSNF-Dlarg we have 8 events per pulse in Larg ND Fid. Vol.)

Accelerator physics Questions (WG III)

Neutrino Factory questions

1. Is **Project X** a suitable proton driver for the Neutrino Factory?

2. What is the path for solving the problem of operating **high gradient RF is strong magnetic field**?

FFAGs

4. ∃? working Injection/Extraction scheme for NS-FFAG Rings?

5. Is chromaticity correction sufficient to reduce the TOF problem for NS-FFAG?

6. Can Scaling FFAG be used in other-than-ring configurations?

15. feasibility of **mini-neutrino factory** (low energy/intensity storage ring for short baseline measurement of cross-sections)

TARGETS for SB and NF

8. Target handling for Multi MW targets ?

9. Proposed target systems are many, convergence ?

10. Material property evolution with time (from radiation, strain & stress and temperature)?

3. NF Target in SC solenoid Does energy deposition pose problem for presently proposed proton drivers?

14. How serious is power deposition in the structures after/around the target (horn, solenoids…)?

13. Is modeling of pion production complete?

Beta-Beam

11. Will the Beta Beam be possible in the CERN Complex ?

12. Verification of the 18Ne production for beta beams ?

Muon physics Questions (WG IV)

1. LFV – also in view of new SUSY limits from LHC

2. μ-e conversion: muon colliders?
3. Dipole moments: g-2, EDM

4. μ→ eee experiment

5. muon beams à RAL, TRIUMF and PSI suitable/upgradable for new LFV experiment search (or do we need a new muon beam?)

ROUND TABLE QUESTIONS

Questions seen as particularly relevant by round table chair (John Ellis)

Oscillation 3: Provide physics motivation of LBL oscillations within wider context of particle physics, beyond a relatively small (compared to the scale of the facility) neutrino aficionados circle.

Oscillation 7: Is any LHC physics search or discovery able to shed light on the neutrino paradigm?

Accelerator Physics 1: Is Project X a suitable proton driver for the Neutrino Factory?

Accelerator Physics 7: Is there a synergetic path from the Neutrino Factory to Muon Collider?

Accelerator Physics 11:
Will the Beta Beam be possible in the CERN Complex?

Muon Physics 1: LFV – also in view of new SUSY limits from LHC?

AND…

How does the suggestion from T2K that $\theta_{13} \neq 0$
and
the (non?)-discoveries from the LHC

change the landscape and prospects
for future generations of neutrino experiments?

The poster shows the three-flavour mixing of the theorists, experimeters and accelerator physicists in Geneva

PROCEEDINGS

The answers to our own questions
The answers to the questions from Round table panel
The list of new questions for NUFACT12
are the result of the NUFACT **work**shop

Should be included in the Proceedings

Proceedings will contain:

Collection of submitted papers
Answers to questions and new questions

Online Book + reference copy for libraries etc…

THANK YOU FOR COMING TO NUFACT 11 WORKSHOP

AND THANK YOU IN ADVANCE FOR YOUR HARD WORK