



Japan and Europe Network for Neutrino and Intensity Frontier Experimental Research



JENNIFER3 Kickoff Meeting

Institut de Física d'Altes Energies
Bellaterra, Barcelona Jan 27-28th 2025



Let me start by first thanking:

- Our colleague Thorsten Lux for kindly organizing this event
- IFAE and its staff for hosting us
- Our Project Officer Annouchka Nabokoff for connecting to this Kickoff meeting
- The WP coordinators for setting up the various sessions
- All of you for participating in person or remotely
- Now and always our local JENNIFER 1-2-3 secretariat and Financial Officer, Filomena Foglietta



A bit of history

JENNIFER Kickoff meeting was held in Rome almost 10 years ago: june 11-12th 2015

Actually we submitted the proposal in april 2014 and we started discussing about it at the end of 2013.

The JENNIFER community is collaborating and evolving together since roughly 10 years !



People is our asset

Many of those who were in the 2015 Rome kickoff are still here, but many have moved and many have joined

During 7.5 years of active JENNIFER projects we supported secondments from Europe to Japan of more than 350 researchers in the framework of Belle II, T2K and HyperK experiments.

We have seen many young people getting skilled and experienced, and many careers getting a boost by working in different labs and groups. This is the authentic MSCA spirit!

Let's now start a new chapter of this experience: **congratulations and cheers to all of us !**



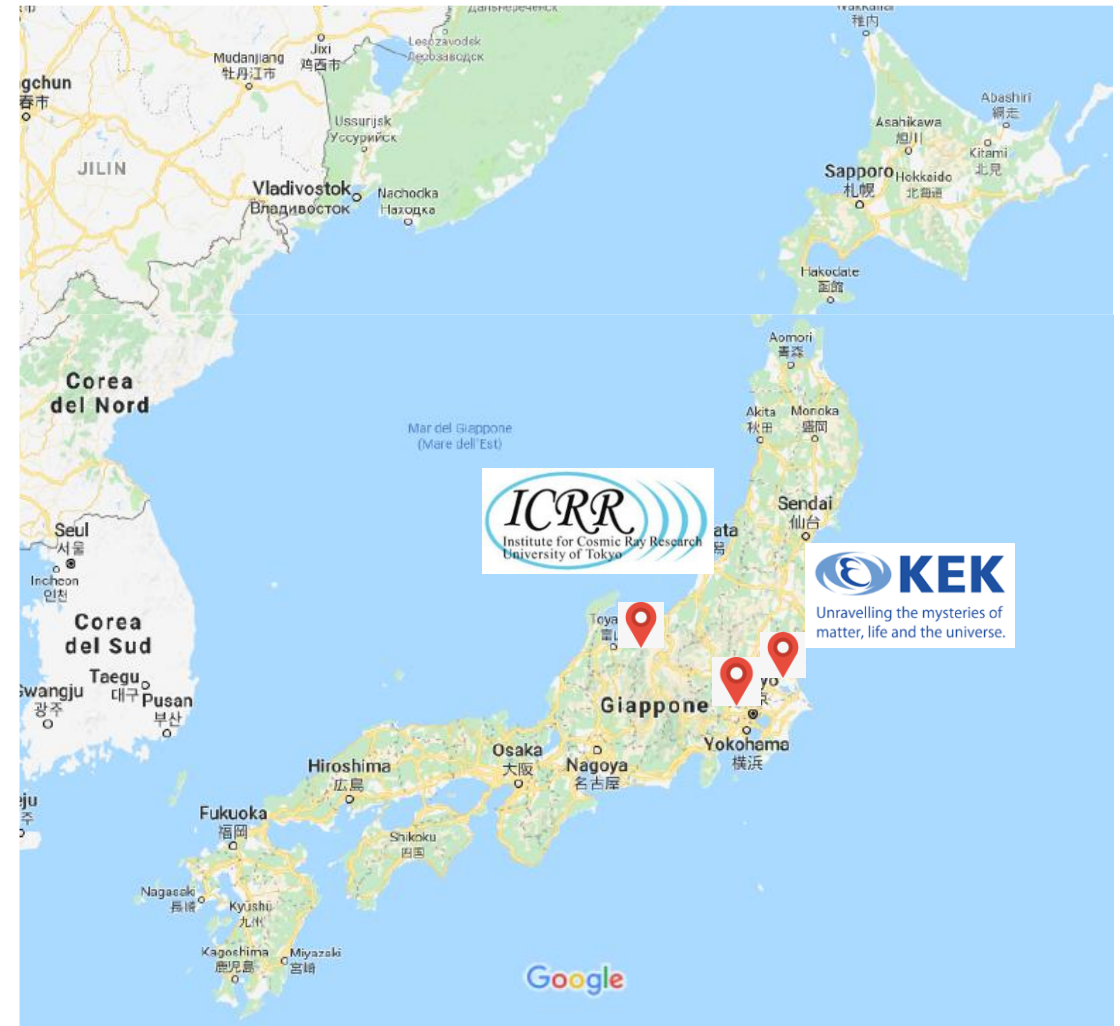
New Consortium composition: Beneficiaries

Participant	WP1	WP2	WP3	WP4	WP5	WP6	WP7	Total Person-Months
1 - INFN	34.00	14.00	29.00	13.00	11.00			101.00
2 - DESY	38.00			7.00	6.00			51.00
3 - CNRS	15.00	4.00	3.00	9.00	1.00			32.00
4 - OEAW Vienna	9.00			3.00	2.00			14.00
5 - JSI Ljubliana	11.00			4.00	3.00			18.00
6 - CEA Saclay		7.00	5.00	1.00				13.00
7 - CU Prague	6.00							6.00
8 - IFJ PAN Cracow	9.00	1.00						10.00
9 - NCBJ Warsaw		6.00	10.00					16.00
10 - TAU Tel Aviv	3.00				1.00			4.00
11 - CAEN			1.00	1.00				2.00
12 - IFAE-CERCA Barcelona		4.00	3.00	1.00				8.00
13 - CSIC Valencia	3.00			1.00				4.00
14 - UU Uppsala					3.00			3.00
15 - USE Sevilla		4.00						4.00
16 - UNIOVI Oviedo			4.00					4.00
Total Person-Months	128.00	40.00	55.00	40.00	27.00	0.00	0.00	290.00

Beneficiaries map



Our Partner Institutions:



But we would like to get back as partners also Université de Geneve and ETH Zurich → work to an amendment soon

JENNIFER3 Activity Structure

WP	Title	Lead beneficiary	Person months	Proposed coordinator
WP1	Search for new phenomena in the Belle II data	OEAW	128	C. Schwanda
WP2	Near detectors for neutrino physics at T2K and Hyper-Kamiokande	CNRS	40	C. Giganti
WP3	Far detectors for neutrino physics at T2K and Hyper-Kamiokande	KCL (partner)	55	F. Di Lodovico
WP4	Advanced Particle detector technologies	INFN	40	C. Cecchi
WP5	Information Technology and machine learning applications	DESY	27	S. Lange
WP6	Outreach and Communication	JSI	0	R. Pestotnik
WP7	Management of the project	INFN	0	A. Passeri

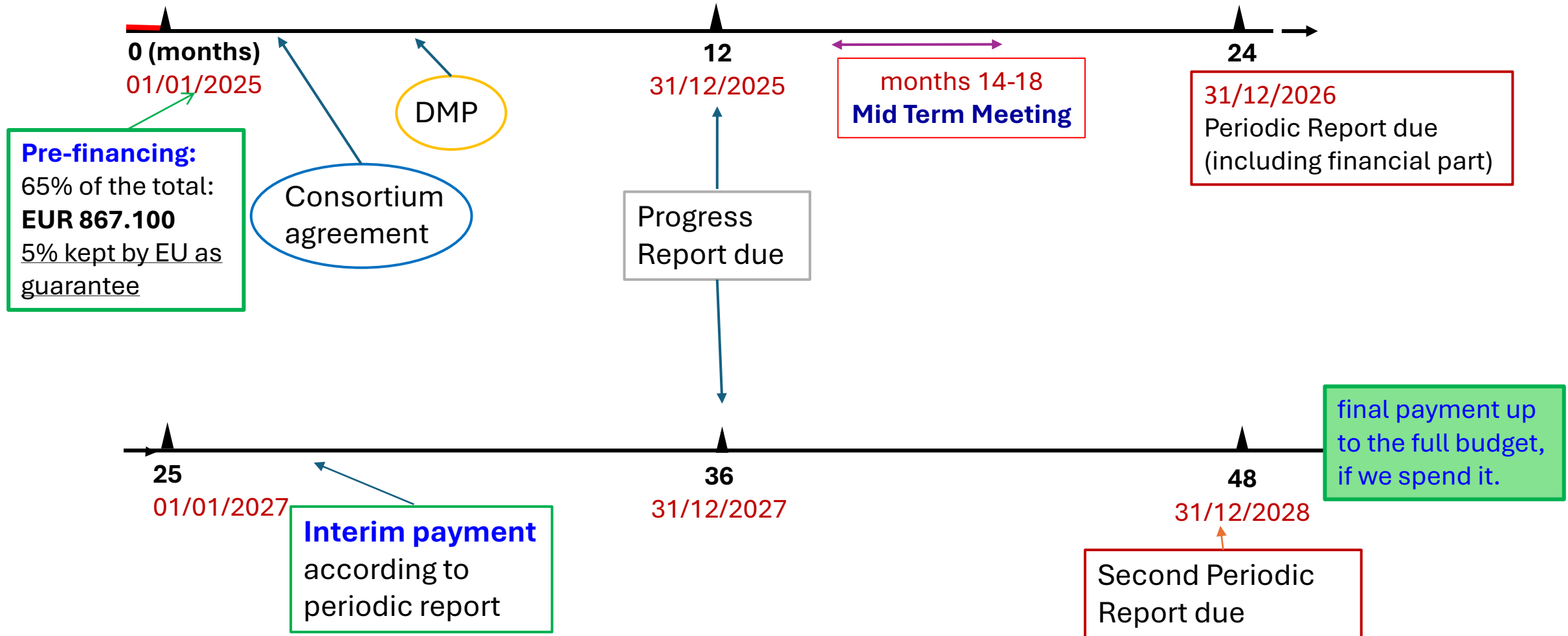
JENNIFER3 Management Structure

Consortium Council : one representative per beneficiary (only INFN has 2, one Belle2 and one T2K).
It votes for its chairperson in its first meeting.
Meets at least one per year, monitor project evolution
Decides on actions to be taken and on Executive committee proposals

Executive Committee: the project coordinator, the 6 WP coordinators, the chair of the Council
Chaired by the project coordinator
Meets regularly, monitor closely the activities and the secondment implementation
Manages common fund according to Council directives
Prepare all the project technical reports to be submitted to EU

Council Chair will be voted tomorrow.

Project lifetime



WP1: Search for new phenomena in the Belle II data

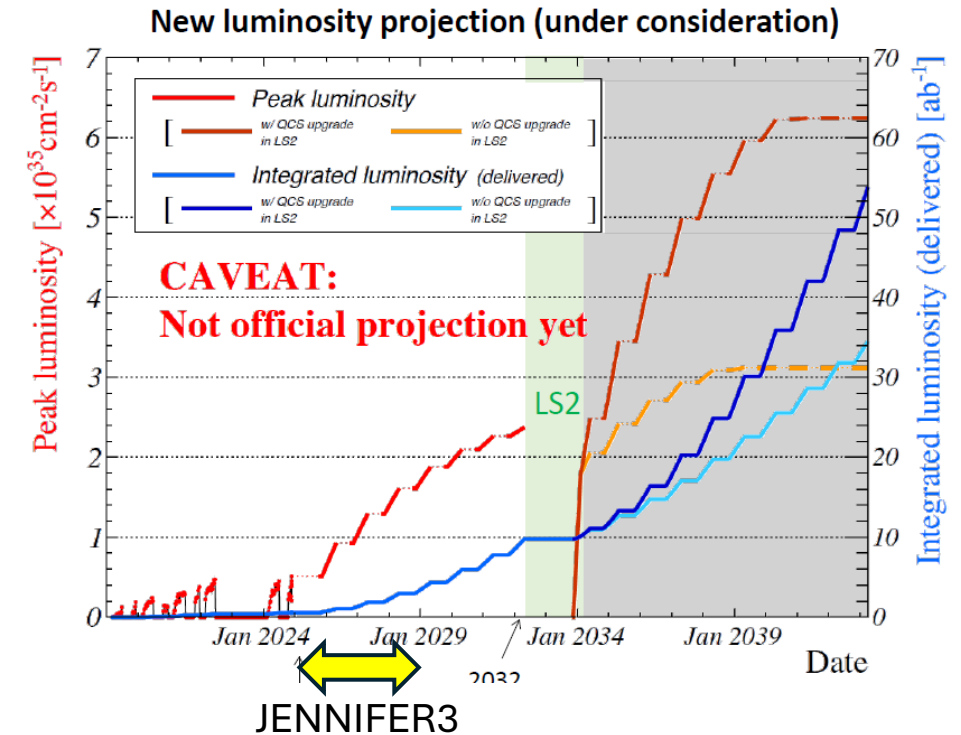
Belle II dataset presently $\sim 0.5 \text{ ab}^{-1}$.
More data to come during JENNIFER3 life

Tasks

- Task 1.1 Detector performance assessment.
- Task 1.2 Precision CKM tests and searches for non-SM CP violation
- Task 1.3 Rare decays and test for lepton flavour non-universality
- Task 1.4 Direct searches for light non-SM physics
- Task 1.5 Quantum chromodynamics: Quarkonium, exotic and hadron spectroscopy

Deliverables

- D1.1 – Belle II report on calibration and performances for collected data set - month 48
- D1.2 – Public Belle II report on CKM tests and CP violation - month 48
- D1.3 – Public Belle II report on LFU - month 48
- D1.4 – Public Belle II report on dark sector searches - month 48
- D1.5 – Public Belle II report on QCD measurements - month 48



WP2: Near detectors for neutrino physics at T2K and Hyper-Kamiokande

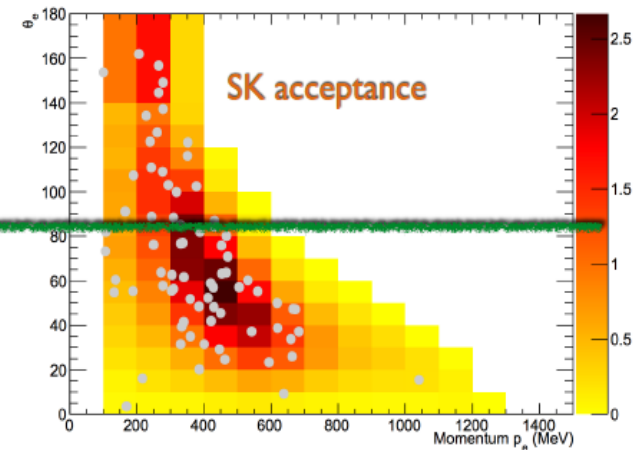
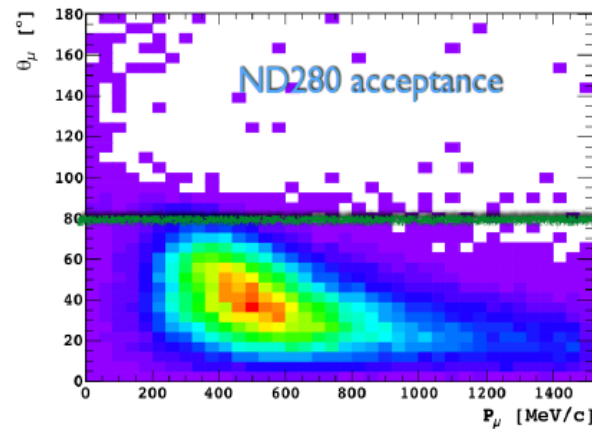
Obtain the most from near detectors
@T2K and designing HK

Tasks

- Task 2.1: Characterization of the new detector technologies of the ND280 Upgrade.
- Task 2.2: Definition of Hyper-K Near Detector strategy, including IWCD and ND280.
- Task 2.3: Neutrino cross-section measurements.
- Task 2.4: Near Detectors inputs to oscillation analyses.

Deliverables

- D2.1 – Public report on upgraded ND280 performances - month 24
- D2.2 – Report on the studie of ND280 and IWCD combination - month 36
- D2.3 – Public report on neutrino cross section measurement using hadron kinematics - month 36
- D2.4 – New T2K oscillation measurement - month 48

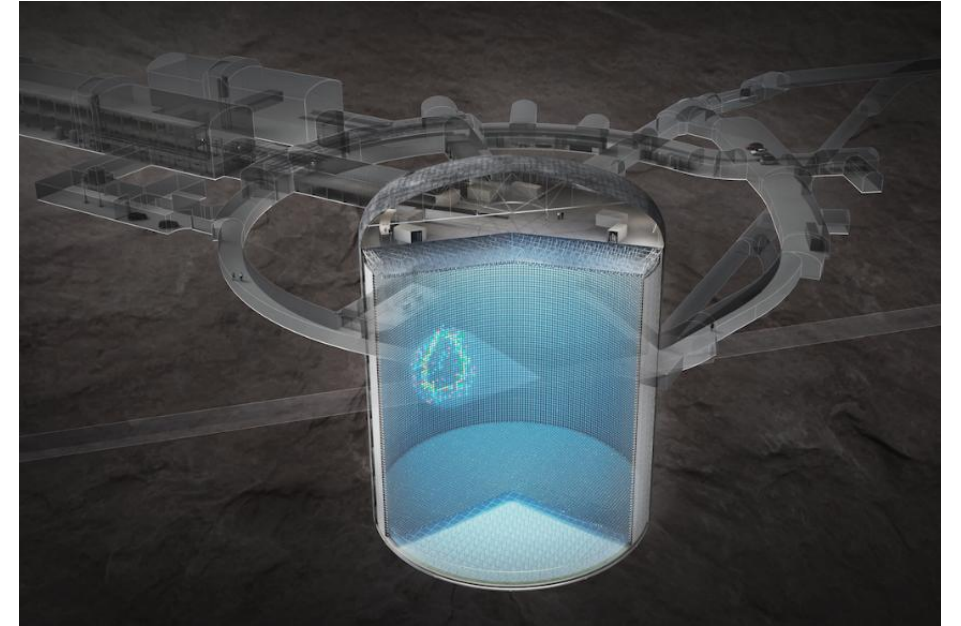


WP3: Far detectors for neutrino physics at T2K and Hyper-Kamiokande

Facing the challenge of a 260 kton water Cerenkov

Tasks

- Task 3.1 High-precision WC calibration and characterization
- Task 3.2 Underwater photodetection system
- Task 3.3 Underwater electronics.
- Task 3.4 CPV analysis.

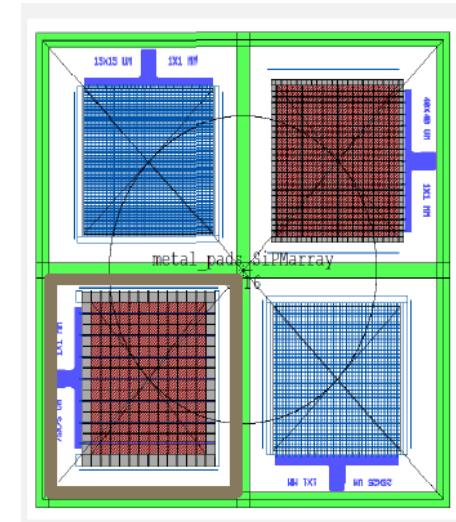
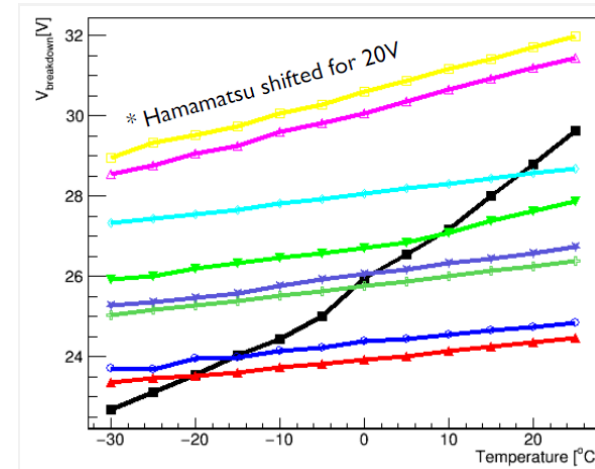
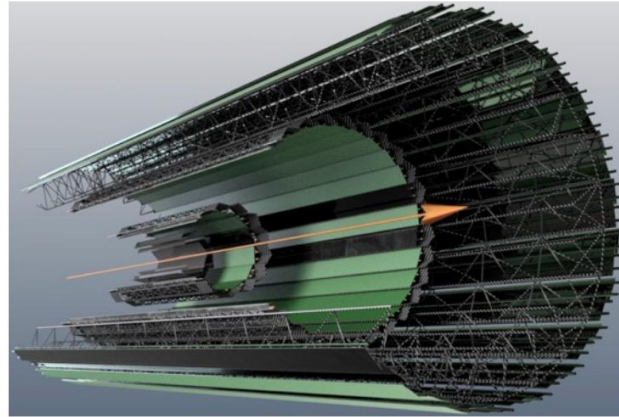


Deliverables

- D3.1 – Report on first Hyper-K calibration - month 48
- D3.2 – Report on the operation of mPMT in Hyper-K - month 48
- D3.3 – Report on the operation of underwater electronics - month 48
- D3.4 – Report on analysis of first Hyper-K data sample - month 48

WP4: Advanced Particle detector technologies

Opening the way for
future experiments



Tasks

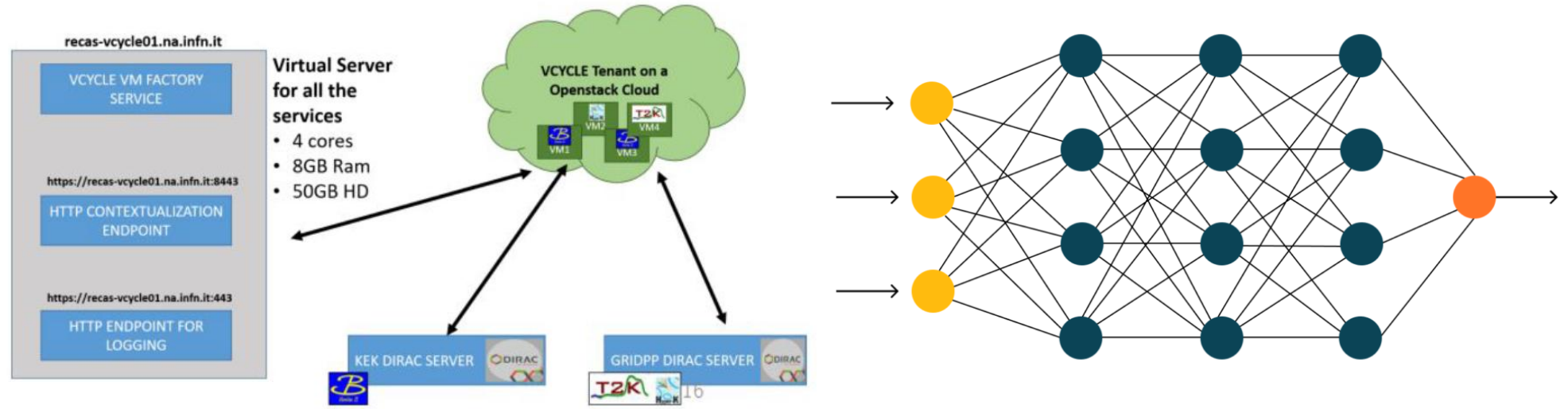
- Task 4.1 Monolithic silicon trackers
- Task 4.2 Photodetection devices for particle detectors.
- Task 4.3 Innovative detectors for particle beam monitoring
- Task 4.4 Future neutrino imaging detectors

Deliverables

- D4.1 – Report on prototype ladder with CMOS sensors - month 48
- D4.2 – Joint report on photodetectors R&D - month 48
- D4.3 – Report on luminometer and polarimeter design for SuperKEKB - month 48
- D4.4 – Report on potentiality of imaging detectors for neutrino physics - month 36

WP5: Information Technology and machine learning applications

Exploit top existing technologies



Tasks

- Task 5.1 Worldwide distributed computing.
- Task 5.2 Advanced network solutions.
- Task 5.3 Machine learning for big data analysis
- Task 5.4 Machine learning for real time applications

Deliverables

- D5.1 – Workshop on cloud computing - month 24
- D5.2 – Report on joint data challenge - month 36
- D5.3 – Bi-annual workshop on ML for data analysis - month 24-48
- D5.4 – Report on real time ML on FPGA - month 48

WP6: Outreach and Communication

Meet people ! General public, high-school students, young physics students.

Tasks

Task 6.1 Masterclasses on flavour and neutrino physics.

Task 6.2 General public particle physics communication with visual tools

Task 6.3 Support to KEK Summer School.

Task 6.4 Joint European-Japanese PhD supervision

Deliverables

D6.1 – MAsterclasses questionnaire analysis - month 48

D6.2 – Virtual reality portable tools - month 48

D6.3 – Co-Organization of KEK Summer school - month 48

D6.4 – Award to best co-supervised thesis - month 48

D6.5 – Communication, Dissemination and Exploitation Plan - month 6

Our main tool: **SECONDMENTS**

Secondment basics:

1 researcher , 1 sending organization

Multiple host organizations allowed

Multiple periods allowed, summing up to at least 30 days over the project life

Multiple WP and tasks always allowed

Exclusive work for JENNIFER3 during secondment

Beneficiary checks:

- Researcher has to be working for the organization since at least 1 month before secondment
- Can be PhD student, post-doc, faculty staff, technical staff. (NO MSc students!)
- Must receive AT LEAST € 2300,00 per secondment month from JENNIFER3 budget ON AVERAGE over the whole secondment
- **Secondee has to be fully covered with health insurance during the secondment** (can be covered with project funds)
- Secondment REPORTING is essential !

Reporting Reporting Reporting !!!

Reporting is essential as much as implementing secondments:

→ **A non-reported or badly reported secondment is a lost one!**

- **BEFORE** the secondment starts, notify name, dates, destination and WPs to jennifer3-secretariat@roma3.infn.it
- JENNIFER3 secretariat will take care of informing the host secretariat and requiring a **secondment declaration**. This is done centrally, do NOT ask for it independently.
- Secondee will have to physically pick-up the secondment declaration from the host secretariat, during the stay and hand it to their institution secretariat. **This has to be kept in case of EU audit.**
- Secondee have to write and sign a brief secondment report at the end of the whole secondment (summing up also several periods). **This also has to be kept for possible audits.**
- For audit purposes beneficiaries have to keep a **CV of all their secondees, all secondments' travel documentation and payment proof. Copy of health insurance of secondee**. Any possible additional proof of the physical presence of the secondee at host organization.
- **Beneficiaries have to upload on the participant portal each secondment period** (adding it to the relevant secondment) formally not later than 30 days after the period start, but in practice it is possible up to the end of each reporting period (RP1: months 1-24, RP2: months 25-48). **Beware: data of RP1 cannot be changed/added during RP2.**

More Reporting

- **Milestones and Deliverables** have obviously to be documented and uploaded in due time. This is mainly in charge to WP and task coordinators.
- All **publications** to which the project «contributes» (supporting authors) have to acknowledge the project and have to be linked on the participant portal (this is a coordinator's duty)
- **Any dissemination and communication activity/event** related or supported by the project has to acknowledge the project and has to be notified to the coordinator for reporting.

Website

On the way of buying a commercial one, ensuring basic features:

- project web identity, news, updates
- Reserved area for the project Pis where always check secondment status and other common infos

Consortium Agreement

Draft implementing both DESCA template and JENNIFER2 specific choices almost ready.

Welcome on board !

Let's start/continue together this new journey



 **JENNIFER**³
EU grant n.101183137

SPARES

Task 4.1

The development of a new vertex detector based on Monolithic Active Pixel Sensors (MAPS) in CMOS technology for Belle II upgrade. With spatial resolution, below 15 μm , material budget around 0.2% X/X_0 per layer for the inner radii and 0.8% X/X_0 per layer for the outermost radii. Hit rate of the order of 120 MHz/cm², a total ionising dose of 100 Mrad and a NIEL fluence (non-ionizing energy losses) of 5×10^{14} neq/cm²

Task 4.2

- Study of Silicon Photomultipliers (SiPM) in single-photon regime in highly irradiated areas of Belle II Particle identification devices (expected fluence more than 10^{12} n/cm²). JSI
- The use of SiPM in a multiphoton regime for the light readout of crystal electromagnetic calorimeters INFN
- ASICs for photodetectors:
 - FASTIC+ low power, low noise amplifier, shaper, and discriminator with a 25 ps TDC. JSI + KEK ?
 - HKROC digitizer (JINST 18 (2023) 01, C01035) for measurement of the charge deposited in the sensors and its Time-of-Arrival (ToA). CEA

Task 4.3

- Luminosity monitor detectors (diamonds) for high lumi SuperKEKB and polarimeter (CNRS)
- FPGA based background monitor (Single Event Upsets) (INFN)

Task 4.4

- High Pressure TPCs for imaging neutrino detectors INFN + CNRS ?
- Emulsions for FASER ν DESY

Task 5.1

Distributed computing: explore the potential of Platform as a Service (PaaS) and Software as a Service (SaaS) paradigms **INFN, CNRS, KLC**

Task 5.2

A collaborative Data Challenge session involving Belle II and Hyper-K, to test network links, storages, replication tools and the entire computing infrastructure that connects Europe and Japan.

Task 5.3

Machine Learning Data Analysis techniques:

- Foundational model for Belle II (DESY, TAU)
- Continuum suppression in Belle II with a DeepSet NN (TAU)
- NN Charm Flavour tagging (HEPHY)
- Punzi-net and Punzi-loss NN for new particle searches (HEPHY)
- Graph NN for seedless track reconstruction (DESY)
- HyperK water cherenkov reconstruction algorithm with NN (INFN)

Task 5.4

ML algorithms in real time environment:

- test of the Versal hardware platform and study realtime applications of pattern recognition in the DAQ and trigger systems for Belle II
- Application of the Versal system to anomaly detection for the Belle II PXD

WP7: Management of the project

Tasks

Manage secondments and their accounting

Coordinate communication and decision making among beneficiaries and partners

Manage risks which can delay or stop the project activities.

Deliverables

D7.1 – Progress report - month 13-37

D7.2 – Mid-term meeting - month 16

D7.3 – Data Management Plan - month 6

Milestones

Project website first version - month 3

Election of Consortium Council Chair - month 6

Kickoff meeting - month 1