

FJPPL (TYL) application 2024

Fiscal year April 1st 2024 – March 31th 2025

Please replace the red examples by the appropriate data in black

ID¹:	Title: Characterization of the upgraded J-PARC neutrino beam for T2K-II and HK experiments					
PIs: Member S:	French Group			Japanese Group		
	name (Family name, First name)	title	lab.²	name (Family name, First name)	title	lab.²
	Popov Boris e-mail: popov@lpnhe.in2p3.fr	Dr	LPNHE	Sakashita Ken e-mail: kensh@post.kek.jp	Prof	KEK
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	Guigue Mathieu	Dr	LPNHE	Koshio Yusuke	Prof	Okayama Univ
	Russo Stefano	Dr	LPNHE	Shiraishi Yuki	PhD	Okayama Univ
Voisin Vincent		LPNHE	Megan Friend	Prof	KEK	
Funding Request from France						
Description	€/unit	nb of units	total (€)	requested to³		
Visit to Japan	150/day	20 days	3000	IN2P3		
Travel	1500	2 travel	3000	IN2P3		
Total			6000			
Funding Request from Japan						
Description	k¥/Unit	nb of units	total (k¥)	requested to³		
Visit to France	20/day	20 days	400	KEK		
Travel	150	2 travels	300	KEK		
Total			700			
Additional Funding from France			Additional Funding from Japan			
provided by/requested to⁴	Type	€	provided by/requested to⁴	Type	k¥	
IN2P3 AP		31000	JSPS	travel	140	
Total			Total			

¹ ID: If program continuation, use previous ID; if new project, ID will be set by the TYL directors;

² e.g. LAPP/IN2P3, Irfu/CEA, IPNS/KEK, etc.

³ IN2P3, Irfu or KEK

⁴ e.g. French Embassy, other CNRS or CEA programs, PICS, European grants, JSPS, RIKEN, Universities;

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Summary Of 2024 Project	<p>In 2024 we will continue our very successful joint France-Japan project with the main goal of improving our knowledge on the upgraded (anti)neutrino beam produced at J-PARC for T2K-II and HyperKamiokande (HK) experiments. After the important J-PARC neutrino beamline upgrade, it restarted the operation at the end of 2023 achieving the record beam power of 760kW. Moreover, operation with a horn current set at 320kA (instead of 250kA used previously) is now tested. In 2024, we will conduct extended periods of physics data taking using upgraded beamlines and neutrino detectors. In addition to the period before summer, we also plan to operate for several months in the fall.</p> <p>The measurements of hadron yields from the surface of the T2K target performed with the upgraded NA61/SHINE spectrometer at the CERN SPS are crucial for detailed characterization of the J-PARC neutrino beam and already allowed to achieve unprecedented precision on flux uncertainties. New data (180M triggers compared to 10M used previously) collected during the 2022 are currently being calibrated and analyzed by a joint team of Japanese and French physicists. In 2024 we plan to finalize the calibration of the raw data and to start the analysis efforts to study the cross-sections for the production of neutral kaons and charged kaons with high momentum, aiming to reduce neutrino flux errors in T2K.</p> <p>In 2024 we also plan to finalize the design of the new time synchronization system being developed for the J-PARC neutrino beam by the joint French-Japanese team. Some additional stability tests would have to be performed on the J-PARC site. A free-running rubidium atomic clock accompanied by a set of GNSS antenna and receivers will be installed at J-PARC, characterized and maintained.</p> <p>In 2024 we also plan to prepare a publication devoted to the results of the new HyperKamiokande sensitivity studies.</p>
Satellite meeting at annual workshop	<p>The group meets regularly on the occasion of NA61/SHINE, T2K and HK collaboration meetings. We also organize dedicated Zoom meetings in order to discuss the ongoing activities and to define plans for the future. In-person workshops are also being scheduled, if needed.</p>
Articles, conference talks & posters related to the TYL project	<p>Development of a Clock Generation and Time Distribution System for Hyper-Kamiokande, Lucile Mellet, Mathieu Guigue, Boris Popov, Stefano Russo, Vincent Voisin, 2023, <i>Phys.Sci.Forum</i> 8 (2023) 1, 72; DOI: 10.3390/psf2023008072</p> <p>Updated T2K measurements of muon neutrino and antineutrino disappearance using 3.6×10^{21} protons on target, T2K Collaboration, K.Abe et al, 2023, <i>Phys.Rev.D</i> 108 (2023) 7, 072011; DOI: 10.1103/PhysRevD.108.072011</p> <p>Addressing the challenge of neutrino interaction uncertainties in Hyper-Kamiokande, C.Dalmazzone (for HK collaboration), talk at the NNN'2023 conference, October 2023</p> <p>NA61/SHINE experiment for neutrino physics, Y. Koshio (for NA61/SHINE collaboration), talk at the NuFact 2023 conference, August 2023</p>
Jointly Supervised Students	

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<p>Comment related to IRL TYL & ILANCE</p>	
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