Template TA MAMI

Work package number	WP4	**Start date**	01/06/2019
Activity Type	Transnational Access		
Work package acronym	TA2-MAMI		
Work package title	Transnational Access to MAMI		
Lead beneficiary	9 - JGU MAINZ		

1. Publicity concerning the new opportunities for access

A dedicated web site has been set up at the beginning of the STRONG2020 project at https://www.blogs.uni-mainz.de/fb08-nuclear-physics/tna/ (English) and http://www.kernphysik.uni-mainz.de/tna/ (German). These pages can be accessed also through the main home page of the Nuclear Physics Institute of Mainz University and the Mainz Microtron MAMI, https://www.blogs.uni-mainz.de/fb08-nuclear-physics/, resp. http://www.kernphysik.uni-mainz.de/, by the "STRONG 2020" symbol on the right side followed by using the transnational access item on the right side. Here it is described who can apply, how to apply, the coverage of the financial support and the structure and service of the research infrastructure MAMI. An application form is provided, links to the experimental setups including their physics program and contact information are given and calls for proposals are announced. There are also cross-links to the main STRONG 2020 homepage. Next to those web-based efforts, the research possibilities at MAMI, although already widely known in the community, as well as the opportunities for access, are regularly advertised at conferences, workshops and meetings, and at open house events to the interested general public.

Moreover, during the reporting period an outreach program for the national and also international public has been launched during the Covid-19 pandemic. This includes virtual tours of the MAMI facility with prerecorded videos of the experimental halls and the accelerator, which is presented in a videoconference session by at least two scientists. Such a format does allow for a very good communication with the audience and to easily provide answers to specific questions. The virtual MAMI tour has been presented at various occasions and does not only disseminate our work at MAMI, but provides also the opportunity to disseminate the transnational access to MAMI. Given the complementarity between on-site tours of the facility and this virtual format, we have continued with the virtual tours also after the end of the pandemic.

2. Selection procedure

Users of MAMI are admitted on the basis of their participation in scientific proposals which describe the physical goals and the necessary work to be carried out. These proposals are evaluated and recommended by a program advisory committee (PAC). According to the statute of the Institute of Nuclear Physics of Mainz University, all physicists are eligible to become either proponents or join an already existing proposal on the consent of the proposing collaboration.

A proposal has to be submitted in written form to the acting director of the laboratory. The acting director will transmit this proposal to the program advisory committee (PAC) of MAMI, which plays also the role of Users Selection Panel. The user then has, in a regular meeting of the program advisory committee, to present his proposal orally. The program advisory committee will give its recommendation, after negotiation in a closed session, in form of a written statement.

2.1 Organization of the Users Selection Panel (USP)

The role of the Users Selection Panel is played by the Program Advisory Committee (PAC) for MAMI and MESA. The PAC consists of renowned scientists from the international hadron physics community.

2.2 Selection criteria

The Program Advisory Committee bases its selection on scientific merit, following the prescriptions of Chapter 4, Article 16.1 of the HORIZON2020 Grant Agreement. According to the statute of the Mainz Nuclear Physics Institute / MAMI, all scientists are eligible to become either proponents or join already existing proposals on the consent of the proposing collaboration.

2.3 Users Selection Panel members

Zein-Eddine Meziani, Chair (Argonne National Laboratory, USA)
Diego Bettoni (INFN Ferrara, Italy)
William Marciano (BNL, USA)
Reinhard Beck (Bonn, Germany)
David Ireland (Glasgow, United Kingdom)
Marco Ripani (INFN Genova, Italy)
Nicole d'Hose (CEA Saclay, France)

All the members of the Users Selection Panel are external experts from the field of hadron and particle physics.

2.4 Users Selection Panel meetings

MAMI PAC Meeting, 11. - 13. March 2020, Mainz, Germany

Special Meeting of the Scientific Advisory Committee regarding future directions:
1. December 2021, online

3. Transnational Access activity during the reporting period

3.1 Detailed description of the activity

[Please describe the activity during the reporting period as reported in Annex I to the Grant Agreement]

The MAMI (Mainz Microtron) research infrastructure delivers a high-current and high-quality electron beam with energies of up to 1.6 GeV and the additional option of beam polarization. The facility currently serves three experimental installations: (1) the A1 experiment with a set of high-resolution magnetic spectrometers for electron scattering experiments; (2) the A2 experiment consisting of the Crystal Ball and TAPS calorimeters, which is located at the tagged photon beam line of MAMI; and (3) the X1 facility for radiation physics experiments as well as detector tests. Beam times are typically shared among the A1, A2, X1, and beam test users. The scientific output in the third reporting period (06/22 – 07/24) is described in detail in the following subchapter.

The STRONG2020 period has been seriously affected by the Covid-19 pandemic with major shutdowns of the MAMI facility due to the severe restrictions at the Johannes Gutenberg University of Mainz. Furthermore, in the winter of 2022/23, the facility has been closed due to the energy crisis in Germany as a consequence of the war in Ukraine. Luckily, most of the third reporting period of the research infrastructure MAMI of STRONG2020 took place in the post-Covid and post-energy-crisis period and hence the standard operation of MAMI could be reinforced again with regular visits of researchers to the infrastructure. As a consequence, significantly more beam hours could be conducted for external researchers of the transnational access.

Table 3.1 lists the number of users as well as the number of man/days spent at the infrastructure. In total, nine projects have been defined for the MAMI Transnational Access Facility, of which two were conducted at the A1 experiment, three at A2, two both at A1 and A2 and one at the X1 setup. Furthermore, also the project dedicated to detector tests took mainly at X1, but some tests had been conducted also at A2 and A1.

At the Institute of Nuclear Physics currently the new MESA electron accelerator (Mainz Energy-Recovering Superconducting Accelerator) is being installed. The maximum beam energy of MESA is with 155 MeV below the energy range accessible at MAMI, but its beam intensity will be an order of magnitude higher. Furthermore, thanks to the innovative energy-recovering (ERL) concept, a new series of precision experiments will be possible, in which the high-intensity ERL beam is operated in conjunction with a very light internal gas target, which will provide high luminosities at ultra-clean experimental conditions. Three experiments for MESA are being setup: the MAGIX experiment, the P2 detector, and the DarkMESA beam dump experiment. For the design of the detector components of these experiments, the availability of the MAMI beam for detector tests was of utmost importance.

Table 3.1 Access to the facility during the reporting period supported by the project

Project No.	User-project acronym	Number of users	Number of man/days spent at the infrastructure
1	MAMI_A1_SFACT	2	28
2	MAMI_A1A2_FORMFACT	13	340
3	MAMI_A1_NUCLEAR	9	219
4	MAMI_A2_MESON	14	190
5	MAMI_A2_POLAR	5	72
6	MAMI_A2_DECAY	6	69
7	MAMI_A1A2_NSKIN	11	394
8	MAMI_DET_TEST	1	4
9	MAMI_X1_RAD	5	36

3.2 Scientific output of the transnational access activity in the reporting period

In this chapter we summarize the scientific outcome and highlights of the A1, A2, and X1 collaborations within the reporting period with a reference to the user projects.

A1 Collaboration

The proton's electric form factor is one of its fundamental properties, reflecting the distribution of inside the proton. The proton's size, expressed by the charge radius, is directly related to the form factor slope at zero four-momentum transfer. In a new A1 experiment the elastic electron-proton scattering process has been measured within the four-momentum transfer range of 0.01 ≤ Q2 ≤ 0.045 (GeV/c)2 using the new gas jet target developed for the future MAGIX experiment at MESA. The A1 results are consistent with the two recent measurements of the proton electric form factors at A1 and PRAD. However, one could not discriminate between the two previous measurements due to the limited statistical uncertainty. There is a clear path to improve the precision by optimizing both the jet target itself (subsequent beam times showed more stable operation) and optimization of the collimator-veto system. The A1 results prove the feasibility of the experiment design using high-resolution spectrometers and the gas jet target for future scattering experiments to resolve the discrepancy in form factor measurements, for example, the MAGIX experiment at MESA [MAMI_A1A2_FORMFACT].

Polarization transfer to a bound proton in polarized electron knock-out reactions, $A(\vec{e},\vec{e}'\vec{p})$, is a powerful tool to look for an in-medium modification of the bound proton. Most properties of the nucleon are modified in the medium due to the off-shell character of the bound nucleon and are no longer directly accessible to experiments. Ratios of polarization variables, however, are less sensitive to bounding effects, but provide still the same sensitivity to nucleon properties like e.g. form factors. With the spectrometer setup of the A1 collaboration an extensive program has been carried out in close cooperation with scientists from Israel. The polarized electron beam of the MAMI accelerator together with the recoil polarimeter of A1 was used for several measurements to extract e.g. the polarization ratio $P'(x)/P'(z)$ of a quasi-free knocked out proton for several nuclei in comparison to the same ratio measured on a free proton target. The results are compared to elaborated calculations that consider the many-body effects accompanying the quasi-free process. [MAMI_A1_NUCLEAR]

Beam-normal single spin asymmetries A_n (or the so-called transverse asymmetries) give direct access to the imaginary part of the two-photon exchange amplitude in the elastic scattering of transversely polarized electrons on unpolarized nuclei. A good knowledge of A_n is not only essential for a better understanding of box diagrams with excited intermediate states in the electroweak sector, but is also important for any parity-violation electron scattering experiment in order to constrain the systematic error from a possible small normal component of the beam polarization vector. This is especially true for future measurements of the neutron skin of nuclei, e.g at MESA. While the theory describes the available data up to $Z \leq 20$ reasonably well, there is significant disagreement between experiment and theory for ^{208}Pb, which motivates more measurements to study the Q^2- and Z-dependence. During the successful campaign at MAMI, using the spectrometer set-up of the A1 Collaboration supplemented by dedicated Cherenkov detectors, the Q^2 dependence of A_n for ^{12}C was determined in the range $0.02\ GeV^2/c^2 < Q^2 < 0.05\ GeV^2/c^2$. Follow-up experiments on ^{28}Si and ^{90}Zr were carried out at $Q^2 = 0.04\ GeV^2/c^2$ to investigate the charge dependence of the transverse asymmetry. Within the given uncertainties, the experimentally determined values for A_n are in agreement with the theoretical calculations. To extend our systematic study of the transverse asymmetry to ^{208}Pb, where the rates are significantly lower compared to the lighter nuclei, new data acquisition electronics were developed. The data from the recent experimental campaign on ^{208}Pb will provide important information on the existing discrepancy between experiment and theory and will further enhance our understanding of two-photon exchange processes. [MAMI_A1A2_NSKIN]. Starting in 2025, with the future MESA accelerator at JGU Mainz, precision experiments in electron scattering are foreseen with the MAGIX experiment, which will consist of two identical high-resolution magnetic spectrometers. One of the key experiments to be carried out is the S-factor measurement of the reaction ${}^{12}C(\alpha,\gamma)^{16}O$, which can be addressed at MAGIX in inverse kinematics. In this case, the alpha particle needs to be detected in coincidence with the scattered MESA electrons producing the quasi-real photon. For the detection of the alpha-particle, a dedicated silicon detector is in preparation, for which dedicated beam time campaigns have been worked out. These beam times allowed for a proof of principle of the overall design and the electronics readout. This project has been carried out in close collaboration with scientists from the University of Kattowice. [MAMI_A1_SFACT]

A2 Collaboration

The extremely high production rate for (pseudoscalar) mesons in photoproduction experiments at A2 opens the avenue for precision form factor measurements by measuring the Dalitz decays: $P \to \gamma\gamma^* \to \gamma e^+e^-$ $(P = \pi^0, \eta,\ \eta')$ and $\omega \to \pi^0 e^+ e^-$. There exist already world-class time-like form factor results by the A2 collaboration for the eta meson. In order to achieve world-leading precision measurements also for the pion and omega mesons, large data sets have been collected at A2. These form factor results are fundamental quantities in hadron physics in itself and allow for a comparison with phenomenological calculations. For the omega transition form factor very surprising results have been reported by the NA60-collaboration from CERN, which are difficult to describe in theory. An independent precision measurement from A2/MAMI is therefore desirable. Previous results from MAMI seem to be better in agreement with theory, however the results are not conclusive due to the limited statistics, which will be improved with the new data. Furthermore, these form factor results are of crucial importance for data-driven evaluations of the hadronic light-by-light scattering contribution to the anomalous magnetic moment of the muon, which allows for a unique precision test of the Standard Model of particle physics. [MAMI_A2_MESON]

The electromagnetic response of protons and neutrons at low energy is encoded by the electric and magnetic dipole polarizabilities as well as higher order spin-dependent polarizabilities. As in atomic, molecular and solid state physics, they describe the size of the electric and magnetic dipole moments induced by external electromagnetic fields and represent benchmarks for predictions of lattice QCD and chiral perturbation theory.
At MAMI, the polarizabilities of the proton have been studied extensively in several Compton scattering experiments with a polarized beam and partially with a polarized target. These measurements were performed in strong collaboration with the University of Pavia (Italy), the George Washington University (USA), the University of Regina and the Mount Allison University (Canada).
With new cross section and asymmetry measurements it was possible to determine the proton scalar polarizabilities with unprecedented accuracy resolving ambiguities in the extraction from the previous world data. With polarized target measurements a first experimental extraction of individual spin polarizabilities was achieved.
Similar studies for the neutron are significantly more difficult due to the lack of free neutron targets and a lower sensitivity due to the missing neutron charge. Isospin-weighted nucleon polarizabilities can be obtained from elastic Compton scattering off light nuclei (D, ^{3}He, and ^{4}He). We have performed pilot experiments with a liquid ^{4}He target and have demonstrated that the elastic Compton scattering can be separated from inelastic channels with the existing detector setup. This work resulted in a proposal for an experiment which was highly rated by the MAMI program advisory committee. Furthermore, the CATS NaI(Tl) detector was put into operation and tested during two

beamtime periods. CATS stands for Compton And Two photon Spectrometer which refers to a setup which was used in the 1990's to measure Compton scattering at MAMI. The goal of these new measurements is to determine the energy resolution and to investigate if this detector can be used to measure elastic Compton scattering on Carbon. [MAMI_A2_POLAR]

The high-intensity, energy-tagged, polarized photon beam in combination with the hermetic Crystal Ball calorimeter and frozen-spin polarized targets makes MAMI a unique facility to study photo-induced meson production with highest precision. The dynamics of these reactions is dominated by the electromagnetic excitation of nucleon resonances and their strong decay into a variety of meson-baryon final states. The experiments at MAMI are performed for more than a decade in close collaboration with groups from the Universities of Basel (Switzerland), Bonn (Gemany), Glasgow (UK), Pavia (Italy), Washington (USA) and York (UK). In 2017, the cryostat of the Mainz polarized target was transported to the ELSA accelerator in Bonn and integrated into the CBELSA/TAPS experiment. This allows us to extend the measurements to energies above 1.6 GeV, which is the maximum MAMI energy. In parallel, the huge amount of existing MAMI data was fully analyzed and calibration measurements with unpolarized target were performed.
The results published during the last 5 years focus on beam asymmetries and the helicity dependence of single and double pion production from protons and deuterons. Furthermore, the new MAMI data allowed a new evaluation of the $E2/M1$ ration of the $\Delta(1232)$ resonance which provides a benchmark for many nucleon models. Finally, it was demonstrated that reliable measurements with elliptically polarized photon beams are possible. Such beams were produced at MAMI via bremsstrahlung of longitudinally polarized electrons at a diamond crystal. [MAMI_A2_DECAY]

Another experimental campaign in the STONG2020 period at A2 is concerned with investigations of possibly exotic forms of nuclear matter, so-called hexaquarks. Evidence for a new resonance with a mass of M ≈ 2380 MeV and a width of Γ ≈ 70 MeV was found in proton-neutron fusion reactions and elastic scattering. Speculations about the nature of this d*(2380) resonance range from the existence of a compact exotic 6-quark particle (hexaquark) to deeply bound ΔΔ molecules or more complex structures involving excited nucleons and meson clouds.
At the energy-tagged photon facility of MAMI, we started a series of experiments to study this state in the simplest nuclear reaction, deuteron photodisintegration. We have measured the photon beam asymmetry as well as the final state proton and neutron polarizations. The results do not exclude a contribution of the d*(2380), however, a clear and convincing evidence for an electromagnetic excitation is still missing.
Therefore, we proposed in 2021 to study spin-observables with a transversely polarized frozen-spin deuterated butanol target within a dedicated German-Russian initiative. However, after the Russian attack on Ukraine, this project could not be realized. Instead, we decided to increase the statistical accuracy of the recoil polarization and the polarization transfer in deuteron photodisintegration. There measurements were performed in 2022 and 2023 with a strong participation of the University of York (UK). The data is presently under analysis and will significantly increase the accuracy compared to the previous pilot experiments which have recently been published. [MAMI_A2_DECAY]

A hardware activity at MAMI is the development of an active polarized target, which was also supported in STRONG2020 in the JRA10 – Cryogenic Pololarised Target Applications (CryPTA). In the STRONG2020 period new ideas and concepts for a second improved version of the polarized active target insert have been developed. The light transport system of the next generation active target insert will for instance be replaced by optical fibers. The use of standard target materials like Butanol in a container of scintillating plastic material is foreseen. First tests of such a system have been carried out in dedicated MAMI beam time periods. [MAMI_DET_TEST]

X1 Collaboration

In recent years, a measuring station for detectors, materials and radiation has been established at the X1 beamline at the Mainz Microtron, which is used by a large number of international collaborations. The excellent properties of the MAMI beam allow focusing in the µm range with a small angular divergence. In particular, this has enabled channeling experiments to investigate channeling process of ultra-relativistic electrons for novel radiation sources. Of particular interest is the emission of undulator-like radiation in periodically bent crystals aiming at the construction of compact radiation sources in the MeV range and beyond. In collaboration with the University of Ferrara, the University of Padua, the INFN section of Ferrara and the Department of Physics and Astronomy, Aarhus the radiation spectra of a large number of crystals have been studied using channelled electrons. Beam manipulation assisted by mechanically bent crystals has been demonstrated to steer negatively charged particles using the channeling effect and volume reflection.
Positron sources are the key elements for the future and current lepton collider projects such as ILC, CLIC, SuperKEKB, FCC-ee, Muon Collider/LEMMA. The design and realization of positron sources are essential due to the challenging critical requirements of high-beam intensity and low emittance necessary to achieve high luminosity.
At MAMI in collaboration with Université Paris-Saclay, and INFN section Ferrara test experiments have been performed to measure the thermal stress and stability of crystalline and amorphous thick tungsten targets. For this purpose, a target station was set up in the dump region of the X1 beamline to achieve high electron currents and small beam sizes.
Positrons do undergo channeling between the planes of a crystal. This suppresses multiple scattering and the particles have a considerably longer dechanneling length, which is advantageous for all types of channeling experiments. Due to the lack of high-quality positron beams, a new beam line has been initiated in collaboration with the MBN research center Frankfurt, the University of Ferrara, the University of Padua, the Hellenic Mediterranean University in Crete and the ESRF in Grenoble to produce a low-divergence positron beam. The positrons are created by pair conversion of bremsstrahlung, produced by the focused 855 MeV electron beam of MAMI in a 10 µm thick tungsten converter target, and energy selected by an outside open electron beam-line bending magnet. The magnetic focusing elements in between are designed to prepare in a well shielded chamber located about 6 m away from the converter target a low divergence positron beam. In a preliminary experiment with this newly developed 530 MeV positron beam, the first successful deflection of the beam in a bent silicon crystal was demonstrated with high efficiency.
[MAMI_X1_RAD]

Table 3.2 List of user meetings

User-project acronym	Date	Venue	Number of users	Overall number of attendees
A1A2-FORMFACT, A1-SFACT, A2-POLAR, A2-MESON, A2-POLAR, A2-DECAY,	07.-12.08.22	Gordon Conference on Photonuclear Reactions Holderness	18	110
A1A2-FORMFACT A1-SFACT A2-POLAR	17.-21.10.22	Santa Margherita NSTAR Conference	8	72
A1A2-FORMFACT, DET_TEST	19.-21.03.23	Mainz MAGIX Coll. Meeting	15	34
A1A2-NSKIN A2-MESON, A2-POLAR, A2-DECAY	04.05.23	A2 Coll. Meeting remote	12	21
A1A2-FORMFACT A1A2-NSKIN A1_NUCLEAR	03.07.-04.08.23	Mainz Few Body Conference	12	150
A1A2-FORMFACT, A1A2-NSKIN A2-MESON, A2-POLAR, A2-DECAY, A2_NUCLEAR	16.-20.10.23	Mainz MENU Conference	43	140
A1A2-FORMFACT, A1A2-NSKIN A2-MESON, A2-POLAR, A2-DECAY, A2_NUCLEAR	31.10.-04.11.23	Paphos EINN Conference	11	63
A1A2-FORMFACT, A1A2-NSKIN A2-MESON, A2-POLAR, A2-DECAY	21.02.24	A2 Coll. Meeting remote	9	22
A1A2-FORMFACT, DET_TEST	26.-28.02.24	Mainz MAGIX Coll. Meeting	14	33
A1A2-FORMFACT A1-SFACT A2-POLAR	17.-21.06.24	York NSTAR Conference	7	70

4. Tables to be filled in the IT tool in Part A of the Periodic Report

4.1 Researchers who have trans-national access to research infrastructures through Union support

Researcher			**Employing organisation/Home institution**			**User-project acronym**	**Activity Domain (Discipline)**	**Installations used by the researcher (*)**		
Name	**Gender**	**Nationality**	**Name**	**Legal Status**	**Country**			**Infrastructure Short Name**	**Installation ID**	**Installation Short Name**
Sebastian Lutterer	*M*	*German*	*University of Basel*	*UNI*	*CH*	*MAMI_A2_MESON*	*Physics*	*MAMI*		
Nicolas Jermann	*M*	*Swiss*	*University of Basel*	*UNI*	*CH*	*MAMI_A2_MESON*	*Physics*	*MAMI*		
Milorad Korolija	*M*	*Croatian*	*Ruder Boskovic Zagreb*	*RES*	*HR*	*MAMI_A1_SFACT*	*Physics*	*MAMI*		
Ryoko Kino	*F*	*Japanese*	*Tohoku University*	*UNI*	*JP*	*MAMI_A1_NUCLEAR*	*Physics*	*MAMI*		
Kazuki Okuyama	*M*	*Japanese*	*Tohoku University*	*UNI*	*JP*	*MAMI_A1_NUCLEAR*	*Physics*	*MAMI*		
Takeru Akiyama	*M*	*Japanese*	*Tohoku University*	*UNI*	*JP*	*MAMI_A1_NUCLEAR*	*Physics*	*MAMI*		
Masaya Mizuno	*M*	*Japanese*	*Tohoku University*	*UNI*	*JP*	*MAMI_A1_NUCLEAR*	*Physics*	*MAMI*		
Tim Kolar	*M*	*Slovenien*	*Tel Aviv University*	*UNI*	*IL*	*MAMI_A1_NUCLEAR*	*Physics*	*MAMI*		
Nicolas Cargioli	*M*	*Italian*	*Universitá degli studi di Cagliari*	*UNI*	*IT*	*MAMI_A1A2_NSKIN*	*Physics*	*MAMI*		
Adriano del Vincio	*M*	*Italien*	*University of Pisa*	*Uni*	*IT*	*MAMI_A1_NUCLEAR*	*Physics*	*MAMI*		
Rhidian Williams	*M*	*British*	*University of York*	*Uni*	*UK*	*MAMI_A1A2_NSKIN*	*Physics*	*MAMI*		
Anatolii Koval	*M*	*Ukrainian*	*Narodowe Centrum*	*RES*	*PL*	*MAMI_A1A2_FORMFACT*	*Physics*	*MAMI*		

			Badan Jodrowych							
Henryk Czyz	M	Polish	University of Silesia	UNI	PL	MAMI_A2_ MESON	Physics	MAMI		
Weiping Wang	M	China	University of Science and Technology of China	UNI	CN	MAMI_A2_ DECAY	Physics	MAMI		
Mohammad Eslami	M	Iranian	University of York	Uni	UK	MAMI_ A1A2_ NSKIN	Physics	MAMI		
Michela Sestu	F	Italian	Universita degli studi di Cagliari	UNI	IT	MAMI_ A1A2_ FORMFACT	Physics	MAMI		
Giovanni Carotenuto	M	Italian	Universita degli studi di Cagliari	Uni	IT	MAMI_ A1A2_ FORMFACT	Physics	MAMI		
David Hornidge	M	Canadien	University of Glasgow	Uni	UK	MAMI_ A1A2_ NSKIN, MAMI_A2_ POLAR	Physics	MAMI		
Michael Gennari	M	Canadien	University of Victoria	UNI	CA	MAMI_A1_ SFACT	Physics	MAMI		
Chien Yeah Seng	M	Malaysian	Michigan State Univ.	UNI	US	MAMI_ A1A2_ FORMFACT	Physics	MAMI		
Camilo Alejandro Rojas Pacheco	M	Colombian	IFAE Fisica dÀltes Energies	RES	ES	MAMI_ A1A2_ FORMFACT	Physics	MAMI		
Constantia Alexandrou	F	Cypriot	University of Cyprus	UNI	CY	MAMI_ A1A2_ FORMFACT	Physics	MAMI		
Marco Battaglieri	M	Italian	INFN	RES	IT	MAMI_A2_ MESON	Physics	MAMI		
Carlo Michel	M	Italian	INFN	RES	IT	MAMI_A2_ DECAY	Physics	MAMI		

Carloni Calame										
Michela Chiosso	*F*	*Italian*	*University of Torino*	*UNI*	*IT*	*MAMI_ A1A2_ FORMFACT*	*Physics*	*MAMI*		
Aleš Cieply	*M*	*Czech*	*Nuclear Physics Institute*	*RES*	*CZ*	*MAMI_A1_ NUCLEAR*	*Physics*	*MAMI*		
Anna Driutti	*F*	*Italian*	*University of Pisa*	*UNI*	*IT*	*MAMI_A2_ MESON*	*Physics*	*MAMI*		
Salvatore Fazio	*M*	*Italian*	*Università della Calabria*	*UNI*	*IT*	*MAMI_ A1A2_ FORMFACT*	*Physics*	*MAMI*		
Alessandra Filippi	*F*	*Italian*	*INFN*	*RES*	*IT*	*MAMI_A2_ POLAR*	*Physics*	*MAMI*		
Paolo Gauzzi	*M*	*Italian*	*Sapienza University of Rome*	*UNI*	*IT*	*MAMI_A2_ DECAY*	*Physics*	*MAMI*		
Francesco Giacosa	*M*	*Italian*	*Jan Kochanowski University*	*UNI*	*PL*	*MAMI_A2_ MESON*	*Physics*	*MAMI*		
Nadine Hammoud	*F*	*Libanese*	*Institute of Nuclear Physics - PAS*	*RES*	*PL*	*MAMI_A2_ MESON*	*Physics*	*MAMI*		
Marc Knecht	*M*	*French*	*CPT/CNRS Luminy*	*RES*	*FR*	*MAMI_A2_ MESON*	*Physics*	*MAMI*		
Niccolò Laurenti	*M*	*Italian*	*University of Milan*	*UNI*	*IT*	*MAMI_ A1A2_ FORMFACT*	*Physics*	*MAMI*		
Raquel Molina Peralta	*F*	*Spanish*	*IFIC-UV*	*UNI*	*ES*	*MAMI_A2_ DECAY*	*Physics*	*MAMI*		
Barbara Pasquini	*F*	*Italian*	*University of Pavia*	*UNI*	*IT*	*MAMI_ A1A2_ FORMFACT*	*Physics*	*MAMI*		
Marketa Peskova	*F*	*Czech*	*Charles University - Prague*	*UNI*	*CZ*	*MAMI_A2_ DECAY*	*Physics*	*MAMI*		

Mauro Piccini	*M*	*Italian*	*INFN-Perugia*	*RES*	*IT*	*MAMI_A2_ MESON*	*Physics*	*MAMI*		
Alessandro Pilloni	*M*	*Italian*	*Universita di Messina*	*UNI*	*IT*	*MAMI_A2_ MESON*	*Physics*	*MAMI*		
Lorenzo Rossi	*M*	*Italian*	*University of Pavia*	*UNI*	*IT*	*MAMI_ A1A2_ FORMFACT*	*Physics*	*MAMI*		
Izabela Skwira-Chalot	*F*	*Polish*	*University of Warsaw*	*UNI*	*PL*	*MAMI_A1_ NUCLEAR*	*Physics*	*MAMI*		
Marian Stahl	*M*	*German*	*CERN*	*RES*	*CH*	*MAMI_A2_ MESON*	*Physics*	*MAMI*		
Elzbieta Stephan	*F*	*Polish*	*University of Silesia in Katowice*	*UNI*	*PL*	*MAMI_A1_ NUCLEAR*	*Physics*	*MAMI*		
Marcin Stolarski	*M*	*Polish*	*LIP*	*RES*	*PT*	*MAMI_A2_ MESON*	*Physics*	*MAMI*		
Tommaso Vittorini	*M*	*Italian*	*University of Genova*	*UNI*	*IT*	*MAMI_DET _TEST*	*Physics*	*MAMI*		
Eric Voutier	*M*	*French*	*Laboratoire de Physique des 2 Infinis Irène Joliot-Curie*	*RES*	*FR*	*MAMI_ A1A2_ FORMFACT*	*Accelerator*	*MAMI*		
David Wilson	*M*	*British*	*University of Cambridge*	*UNI*	*UK*	*MAMI_ A1A2_ MESON*	*Physics*	*MAMI*		
Mihai Mocanu	*M*	*Romanian*	*University of York*	*UNI*	*UK*	*MAMI_ A1A2_ NSKIN*	*Physics*	*MAMI*		
Hugo Garcia Tecocoatzi	*M*	*Mexican*	*INFN*	*RES*	*IT*	*MAMI_A2_ DECAY*	*Physics*	*MAMI*		
Annalisa D'Angelo	*F*	*Italian*	*INFN-Roma Tor Vergata*	*RES*	*IT*	*MAMI_A2_ DECAY*	*Physics*	*MAMI*		
Elias Gerstmayr	*M*	*German*	*Queen´s University Belfast*	*UNI*	*UK*	*MAMI_ A1A2_ NSKIN*	*Physics*	*MAMI*		

Stuart Fegan	*M*	*British*	*University of York*	*UNI*	*UK*	*MAMI_ A1A2_ NSKIN*	*Physics*	*MAMI*		
Mohammad Eslami	*M*	*Iranian*	*University of York*	*UNI*	*UK*	*MAMI_ A1A2_ NSKIN*	*Physics*	*MAMI*		
Stephen Kay	*M*	*British*	*University of York*	*UNI*	*UK*	*MAMI_ A1A2_ NSKIN*	*Physics*	*MAMI*		
Alistair Coates	*M*	*British*	*University of York*	*UNI*	*UK*	*MAMI_ A1A2_ NSKIN*	*Physics*	*MAMI*		
Benjamin Collins	*M*	*British*	*University of York*	*UNI*	*UK*	*MAMI_ A1A2_ NSKIN*	*Physics*	*MAMI*		
Andrzej Wilczek	*M*	*Polish*	*University of Silesia in Katowice*	*UNI*	*PL*	*MAMI_X1_ RAD*	*Physics*	*MAMI*		
David Valzani	*M*	*Italian*	*University of Pavia*	*UNI*	*IT*	*MAMI_X1_ RAD*	*Physics*	*MAMI*		
Alexei Syton	*M*	*Belarus*	*INFN-Ferrara*	*RES*	*IT*	*MAMI_X1_ RAD*	*Physics*	*MAMI*		
Andrea Mazzolari	*M*	*Italian*	*INFN-Ferrara*	*RES*	*IT*	*MAMI_X1_ RAD*	*Physics*	*MAMI*		
Marco Romagnoni	*M*	*Italian*	*University of Ferrara*	*UNI*	*IT*	*MAMI_X1_ RAD*	*Physics*	*MAMI*		
Stefan Groote	*M*	*German*	*University of Tartu*	*UNI*	*EE*	*MAMI_A2_ MESON*	*Physics*	*MAMI*		
Matteo Ronchi	*M*	*Italian*	*University of Pavia*	*UNI*	*IT*	*MAMI_ A1A2_ FORMFACT*	*Physics*	*MAMI*		
Sarah Littlejohn	*F*	*Canadian*	*Mount Allison University*	*UNI*	*CA*	*MAMI_A2_ POLAR*	*Physics*	*MAMI*		
Maggie Kerr	*F*	*Canadian*	*Mount Allison University*	*UNI*	*CA*	*MAMI_A2_ POLAR*	*Physics*	*MAMI*		

4.2 Research infrastructures made accessible to all researchers in Europe and beyond through EU support and summary of trans-national access provision per installation per reporting period (RP)

Participant number	**Organisation short name**	**Short name of infrastructure**	**Installation**		**Unit of access**	**Min. quantity of access to be provided in Annex I (A)**	**Access provided in RP3**
			Number	**Short name**			
9	*JGU Mainz*	*MAMI*			*Beam hours*	*450*	*1615*