

7.R5 Activity JRA5: Polarised Neutron Techniques (PNT)

The detailed implementation plan for the first 18 months of the project is given in Table 3 in Section 6.R5.2.

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Milestones and deliverables for tasks T1 – T7 relating to the first reporting period and the first 6 months of the second reporting period.

Task		Milestones		Deliverables
T1 Developments of 3-d analysis of polarization in inelastic/quasielastic neutron scattering, diffraction and reflectometry				
Year 1				
T1-B	P6	Design of interface between SPAN (NSE) and CRYOPAD Design and optimisation of novel compact “solid state” polarisers.	P6	Design of interface between SPAN (NSE) and CRYOPAD Design and optimisation of novel compact “solid state” polarisers.
T1-C	P5 P9	Principles of 3-d thin film spin-turners. MCNP simulations Equipment of 4-circle diffractometer 6T2 of LLB by polariser, analyzer and flipper	P9	Polariser, analyzer, flipper
T1-D	P8	Principles of set-up designed		
T2 Further developments in neutron spin echo technique.				
Year 1				
T2-A	P5 P2 P7 P6	Training of the designated person, fixation of the concept, fixation of the electric contact concept, start to build the first prototype Calculations and mechanical design of Fresnel coil for wide angle rectangular correction at BNC-ILL Fresnel coil design and cutting Testing and field mapping Identification of the field requirements/current parameters to provide additional Larmor precession needed to correct for curvature effects accounted in NRSE-TAS set-up. Identification of the field requirements/current parameters to provide additional Larmor precession needed to correct for curvature effects accounted in NRSE-TAS set-up.	P5 P7	Simulations of the concepts; concept analysis Technical drawings. New device. Report.
T2-B	P5	Software development	P5	Software
T2-C	P4 P7 P9	Preliminary design of the large solid angle coils (LSA) . Development of wide-angle NRSE coils Test of the coils quality and homogeneity in a polarized neutron beam Construction of a large RF coil, test in a polarized neutron beam.	P4 P7 P9	Results of SANS tests of various coil materials for the optimisation of the transmission and reducing of the small angle scattering . Report. Numerical optimisation and design of the different elements (LLB, TUM). Construction of a limited area cylindrical static coil with magnetic shielding Technical drawings, exp. report
T2-D	P7	Delivery of new NRSE coils optimized for longitudinal field geometry	P7	New device. Report.

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T3 Developments of NSE (NRSE and NSE) technique for an increase in the resolution of inelastic scattering instruments.				
Year 1				
T3-A	P3	Construction of electronics. Implementation of software.	P3	Control electronics and software
T4 Development of thin film based Larmor precession devices				
Year 1				
T4-A	P2	Preparation of NiFe based hard magnetic foils in BNC , Neutron test at BNC.	P2	Report, test foils
	P4	Concept study for the use of thin films devices in different instruments of the FRM-II.	P4	Test results of the material tests.
	P9	Fabrication of thin MF with very soft magnetic properties over small surfaces. Evaluation of the use of epitaxial thin MF. Characterisation of the MF magnetic properties (standard static magnetisation, dynamical properties in RF fields by Kerr effect). Development of RF field generation appropriate for the use in a neutron scattering environment Simulations of stray fields and eddy currents in lithographic structures.		
T4-B	P5	Depolarisation studies of metallic glass films MCNP simulations of the set up.	P5	Report
	P9	Fabrication of non magnetic wave-guide for characterisation purposes.Design of appropriate magnetic wave-guide structures (with O8)	P9	Ultrasoft magnetic thin films with appropriate properties (minimal losses, no SANS)
T4-C	P9	Design of optimised magnetic wave guides. Simulation of magnetic wave guide structures		Design of optimised magnetic wave guides Simulation package of magnetic wave guide structures
T4-D	P2	Calculation and mechanical design of wide band polariser stack	P2	Report, experimental device
	P7 P11	Flipper Simulations (ANSYS)	P7 P11	Technical drawings. Report.
T4-E	P5	Principle of fast flipper designed		Report.
Year 2				
T4-E	P5	Construction of fast spin flipper, neutron tests	P5	Report, experimental device. Publication

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T5 Novel Larmor precession based instrumentation for reflectometry, SANS and diffraction				
Year 1				
T5-A	P8	Spin flipper for white beam		
T5-B	P2	Design of upgrade of the BNC reflectometer. Design of components cooperation with P6	P2	Mechanical design
	P7	Production of current sheets/phase shifters Installation of PSD in SESANS	P7	New devices. Technical drawings.
	P8	Development, construction and manufacturing of a NSE option on the HMI reflectometer V6 based on thin film Larmor precession devices.		
T5-D	P5	Implementation of time-resolved detection test with chopper in white beam, software development Design of HF magnetic field sample		Technical report Technical drawings of sample environment.
T5-C	P10	Detailed evaluation of the GISANS-Performance of REFSANS		Experimental report, publication
T6 New Larmor precession based methods.				
Year 1				
T6-A	P1	QM treatment	P1	Report
T6-B	P1	Test of convergence		
T7 Management, dissemination and exploitation				
Year 1				
	P5 All partners	PNT-JRA kick-off meeting (#1), dissemination of the pre-existing know-how, construction of the web page.	P5	The PNT-JRA web page
	P5 All partners	PNT-JRA meeting #2. Workshop on polarized neutrons in condensed matter investigations –PNCMI (USA).	P5	PNCMI Workshop
			P5	School (training course) on polarized neutron scattering
	P5 All partners	PNT-JRA meeting #3.		Annual report

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Year 2			
	P5 All partners	PNT-JRA meeting #4	P5