



Deliverable Number: D 18.15

Deliverable Title: User friendly platform for the exploitation of precession data

Delivery date:	48
Leading beneficiary:	CEA (7)
Dissemination level:	Public
Status:	completed
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Project number:	283883
Project acronym:	NMI3-II
Project title:	Integrated Infrastructure Initiative for Neutron Scattering and Muon Spectroscopy
Starting date:	1 st of February 2012
Duration:	48 months
Call identifier:	FP7-Infrastructures-2010
Funding scheme:	Combination of CP & CSA – Integrating Activities

User friendly platform for the exploitation of precession data

A set of high level routines have been written in Matlab so as to be able to process precession data in a very flexible way. As a free alternative users may use Scilab (<http://www.scilab.org/>) which is compatible with Matlab.

The routines are freely available on the [Neutron Spin Precession Spectroscopy](#) page on the iramis.cea.fr website

Description of files and directories

- magFunctions: Functions to calculate the magnetization
 - wire3Field.m
 - wirePlanField_vector.m: Calculates the magnetization in the wire in one direction and the resulting leakage field
 - wireVortexField_vector.m: Calculates a magnetization in the wire form of vortex
- subroutines
 - old: Old versions of some functions
 - math: Mathematical Functions
 - ratioOmegaLB.m: Calculates the criterion of adiabatic $\omega L / \omega B$
 - precessXY.m: Differential Equation of the precession of neutrons
 - travel3.m: differential equation solver of
- plotFunctions
 - plotFieldMap.m: Trace the field mapping in and around the wire
- C_BeamPolar.m: Class
- computePolarization.m calculates polarization (main function)
- computePolarizationAnalytic.m: Analytical Calculates with M purely vertical.
- Example.m: Example of computePolarization
- addSubFolders.m: Adds under the root folder directories to ensure proper functioning of the various program routines

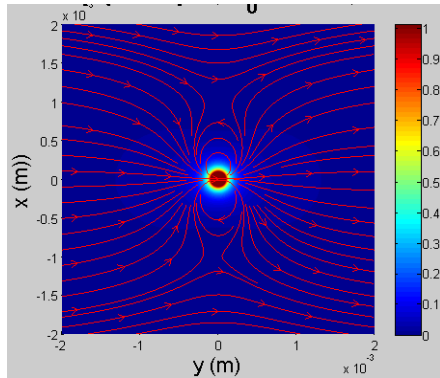
The file Exemple.m gives an example using computePolarization function. Its operation and its parameters entered its explained in detail in the docstring of computePolarization.

This function returns a C_BeamPolar class object. The latter contains the polarization calculated based on the lateral position and the wavelength (because of dispersion). It offers a number of methods to manipulate the polarization and draw it.

The created objects are highly versatile so as to make it possible to perform complex comparison and manipulations of data.

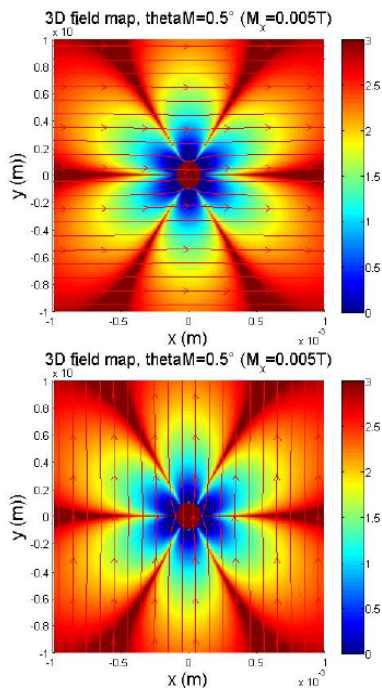
Example of use

Generation of field maps



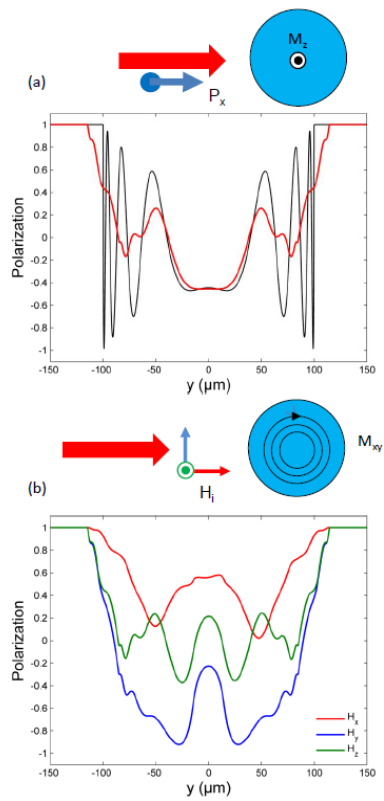
Magnetic induction field maps can be generated which include both the internal magnetization, the stray fields generated outside the magnetic object and the applied magnetic field

Calculation of adiabaticity maps



The corresponding adiabaticity maps can be plotted to evaluate the sensitivity regions and make sure that not depolarization occurs

Precession maps



It is possible to plot the precession scan maps for various magnetic configurations and applied magnetic field.

The wavelength resolution spread together with the spatial resolution can be included

These routines were in particular used for processing the data on *Internal magnetic structure of soft microwires probed by neutron spin precession by F. Ott et al.*