Experimental plan (SI-1794)

(02.12-07.12 2010.)

Timing (plan):

00-04	**L. Deák**	00-04	**Gy. Vankó**
04-08		04-08	**H. Spiering**
08-12	**D.L. Nagy**	08-12	
12-16		12-16	**L. Bottyán**
16-20	**G. Kertész**	16-20	
20-24		20-24	**Gy. Vankó**

Samples:

1. ^{57}Fe foil, 2.9 μm (5.8 mg): visible (by optical microscopy) ripples of widths of 50-100 /um and an average distance of about 150 /um
2. ^{57}Fe foil, 3.8 μm (3.8 mg): ripples and porous
3. ^{57}Fe foil, **6 μm** (6 mg): no ripples
4. ^{57}Fe foil, **6.9 μm** (6.9 mg): ripples
5. ^{57}Fe foil, 23 μm (23 mg): gentle ripples
6. ^{57}Fe foil, slivers –(5.5 mg)
7. ^{57}Fe foil, **2x1.5 μm** (9.2 mg): very gentle ripples

7.a ^{57}Fe foil, **1.6 μm** (3.5 mg): very gentle ripples

7.b ^{57}Fe foil, **1.7 μm** (3.7 mg): very gentle ripples

8. ^{57}Fe foil, 5.9 μm (18.4 mg)

01103. ^{57}Fe thin layer of 150A (10x20 mm)

01104 ^{57}Fe thin layer of 150A (15x10 mm) visible better quality of surface, MOKE was performed

A1 and A2: 200 nm ^{57}Fe on mica (D0204, 155nm of thickness) (SI1255, 2005. October)

B1: (020607) MgO(001)/^{57}Fe(20 nm) (14 mm × 10 mm) (SI1255, 2005. October)

Experimental purpose:

1. sample classification: finding the mostly homogeneous 1mm x 1mm part of sample 3, 4, 7, 7a and 7b
2. Main: to show out reciprocity violation in the suggested experimental geometry by NRFS of SR, using analyzer
3. Stroboscopic experiment for showing out reciprocity violation on a single foil (using analyzer)
4. repetition of some part of the experiment SI1255. Determination of the direction of the hyperfine field by NRFS of SR

The order of importance of task 3 and 4 depends on the experimental feasibility of the stroboscopic experiment. If the effect could be found, task 3 would have high importance.

Tasks:

Notations: angular positions	A (θ=90˚, φ=45˚)	$A^{reciprocal}$ = A' (θ=90˚, φ=135˚)
	B (θ=135˚, φ=0˚)	$B^{reciprocal}$ = B' (θ=45˚, φ=180˚)
	C (θ=90˚, φ=0˚)	$C^{reciprocal}$ = C' (θ=90˚, φ=180˚)
	D(θ=90˚, φ=90˚)	$D^{reciprocal}$ = D'(θ=90˚, φ=90˚)

1. sample characterization by focused beam or micro beam. Cut sample 3 to two peaces -3a and 3b
   - 1.1. selection of the most homogeneous 1mmx1mm part of the sample 3a and 3b
   - 1.2. NRFS experiments with focused beam in the previously selected homogeneous parts, with a resolution of 0.1 mm (at least)
   - 1.3. NRFS without analyzer. Sample 3a in position A
   - 1.4. NRFS without analyzer. Sample 3b in position B
   - 1.5. NRFS on sample 3a, 3b, without analyzer
   - 1.6. NRFS with analyzer. Only sample 3a, in position A
   - 1.7. NRFS with analyzer. Only sample 3b, in position B
   - 1.8. NRFS on sample 3a, 3b together, with analyzer
   - 1.9. Reciprocal situation, 180˚ rotation around the vertical axes.
     A->A'(90˚, 135˚)
     B->B'(45˚, 180˚), and the change the order of 3a,3b to 3b,3a.
   - 1.10. NRFS without analyzer. Sample 3a in position A'
   - 1.11. NRFS without analyzer. Sample 3b in position B'
   - 1.12. NRFS on sample 3b, 3a, without analyzer
   - 1.13. NRFS with analyzer. Only sample 3a in position A'
   - 1.14. NRFS with analyzer. Only sample 3b in position B'
   - 1.15. NRFS on sample 3b, 3a together, with analyzer
   - 1.16. changing back to the original positions: 180 degree of rotation around the vertical axis
     A'->A(90˚, 45˚)
     B'->B(135˚, 0˚), and the change the order of 3b,3a back to 3a,3b.
   - 1.17. rotation by 45˚ of the 3a sample, around the horizontal axis
     A -> C
   - 1.18. repetition of 1.3 to1.15, by the way A -> C
   - 1.19. repetition of 1.3 to1.15, by the way A -> D
2. Stroboscopic detection setup.
   - 2.1. Repeating the experiments 1.8 and 1.15
   - 2.2. experiment with one sample only: direct position B
   - 2.3. reciprocal position B'
3. Feri's experiment