Report STSM:
Polarization in the radio and optical spectra of AGNs

From November 5 to 10, 2013 I was visiting, in the frame of STSM of COST action MP1104, the Max Planck Institute for Radio-astronomy in Bonn (Germany). During my visit I daily discussed with Prof. Dr. Anderi Lobanov possible collaboration in investigation of polarization in AGNs, in two spectral bands – optical and radio. Shortly I can outline following:

1. ***Optically monitored AGNs.*** In 2012 we started the spectropolarimetric observations, a monitoring program of 12 type 1 AGNs (see Table 1) with the 6m telescope of Special Astrophysical Observatory (SAO) of Russian Academy of Science RAS). For these observations we are using Universal Focal reducer SCORPIO in two spectropolarimetric modes. In the first mode we use an analyzer of polarization (turned on the fixed angle of 0 and 45 degree) with the Savart plate (see Afanasiev & Moiseev 2005). The spectral resolution is around 40A in the wavelength range from 4000 to 7500A. The instrumental polarization is 0.2% and an accuracy of the measured linear polarization is about 0.3%. The second mode is with the Wollaston prism (apochromatic turned phase plate $\lambda/2$). The spectral resolution is around 10A, covering the wavelength band from 4000 to 8000A. The instrumental polarization is smaller than 0.05% and accuracy of measuring linear polarization is about 0.1%. We search from radio observations of these objects and found that a number of them should be observed, but we found that in some cases there are observations in the radio band. As e.g. 3C390.3 was observed by Taylor et al. (2001, ApJ 559, 703) and found that polarization in the radio galaxy core is not significant (even we observed it in the Hα line, see Fig. 1). The similar case is with 3C120 (see .Jorstad et al. 2007, AJ, **134** 799). We decided to write a proposal for radio-polarometric observations of cores of a number of AGNs from Table 1, in order to have complete radio-polarometric data.
2. ***Contribution of the jets to optical and radio polarization.*** In this part, we selected a sample of 17 AGNs (see Table 2) which are radio-loud AGNs with jet, and where we can estimate the jet angle. In the optical part, they are double-peaked broad line emitters (see Fig. 2). We decided to write proposals for optical and radio-polarometric observations of these objects.

Additionally, we discussed about theoretical approaches of polarization in AGNs, i.e. role of disk, torus and jet.

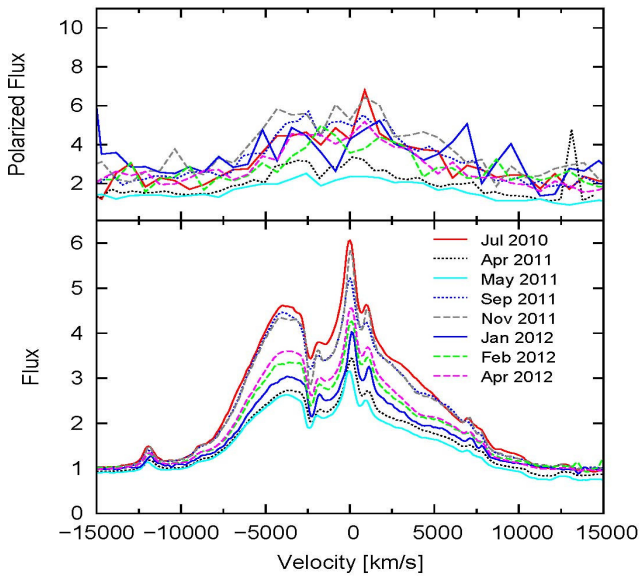
After this visit, I moved to Ghent (from Nov. 10 to 13, 2013), to discuss together with M. Baes, D. Ilic and M. Stalevski polarization in torus.

We would like to thank the COST action 1104 for help in realization of this mission and we hope that we will be able to present some results very soon.

Table 1. List of type 1 AGNs observed (spectropolarimetry) with the 6m telescope of SAO RAN in the period 2012-2014.

Objects	Coordinates			
m(b)	M(b)	z	Sy	
	R.A.(1950)		D(1950)	
3C 120	04 33 11.1		+05 21 16	
14.30	−21.81	0.0331	1.0	
Mkn 6	06 45 43.3		+74 29 07	
14 29	−20.41	0.0185	1.5	
NGC 3516	11 03 22.8		+72 50 20	
12 45	−20.4	0.0088	1.0	
NGC 4151*	12 08 01.1		+39 41	
11.13	−19.3	0.0033	1.5	
Mkn 668	14 07 00.39		+28 27 15	
14.78	−22.64	0.077	1.0	
NGC 5548*	14 15 43.5		+25 22 01	
13.21	−20.9	0.0168	1.0	
ARP 102−B	17 17 56.3		+49 01 56	
14.70	−20.4	0.0256	1.0	
E1821+643	18 21 41.9		+64 19 18	
14.24	−27.1	0.297	QSO	
3C390.3*	18 45 37.6		+79 43 00	
15 28	−21.64	0.0556	1.0	
Akn 564*	22 40 18.3		+29 27 47	
14.4	−20.9	0.0253	1.0	
NGC 7469*	23 00 44.4		+08 36 16	
12.60	−21.63	0.0167	1.0	
NGC 7603	23 16 22.9		−00 01 47	
13.99	−21.46	0.0295	1.0	

Figure 1. Hα line profiles in polarized (upper panel) and unpolarized light (bottom panel) for 3C 390.3



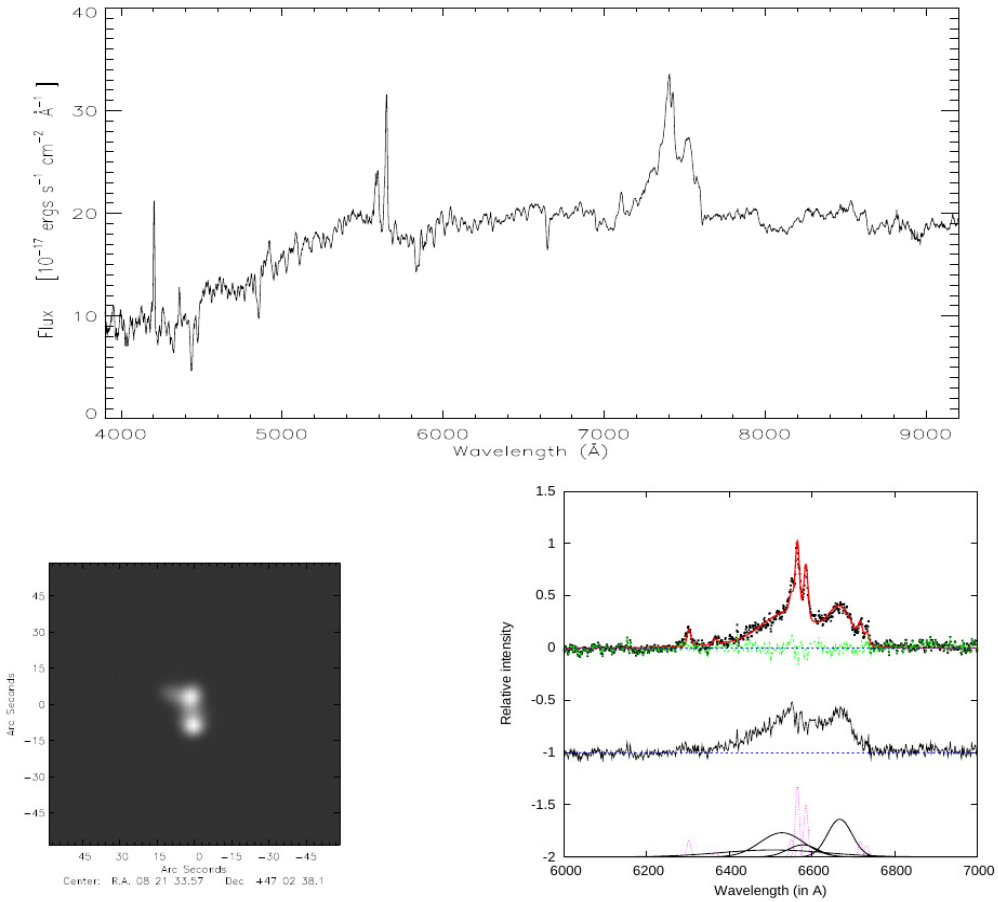


Fig. 2. SDSS J082133.60+470237.3, the AGN with double peaked lines (panel up and donwn-right) and with radio-jets (panel down-left)

Table 2. Selected double-peaked broad line emitters with radio-jets

J004319.73+005115.4	J230545.67-003608.5	J113021.41+005823.0
J022014.57-072859.2	J024703.24-071421.5	J123807.76+532556.0
J102738.53+605016.5	J075407.96+431610.6	J132834.14-012917.6
J114051.58+054631.1	J080644.42+484149.2	J141613.37+021907.8
J133312.42+013023.7	J081700.40+343556.3	J163856.53+433512.5
J230443.47-084108.6	J082133.60+470237.3	

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