

The LINER NGC 7097: the AGN and its mirror

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Introduction

- Goal: Search for low luminosity AGN in early type galaxies
- Data cube observed with GMOS-IFU on Gemini South Telescope
- Apply PCA tomography on the data cube in order to detect and characterize LLAGN.

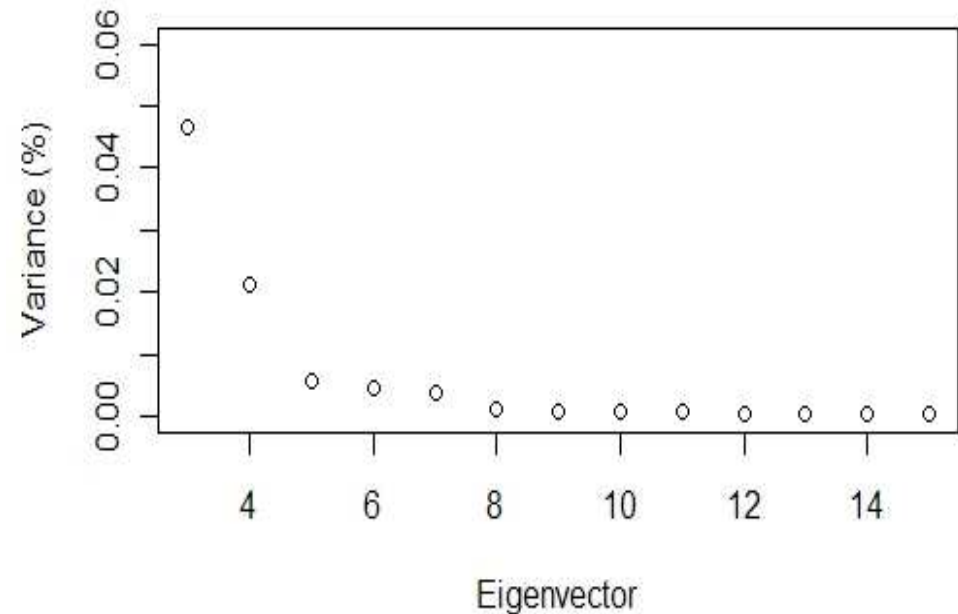
PCA tomography

- Search for spectro-spatial variance in the datacube.
- Not a set of objects; a set of spatial pixels of the same data cube. The wavelength pixels are the properties.
- Linear transformation to a new system of coordinates.
- The coordinates are orthogonal.
- Eigenspectra – Show correlations between the wavelengths.
- Tomograms – Show where the correlations appear in (x,y) space. Tomograms are the projections of the data on the eigenvectors; “slices” of the data in the eigenvector space.
- Most useful information in a few eigenvectors. Dimensional reduction.
- See Steiner et al 2009, MNRAS, 395, 64

NGC 7097: Eigenvalues

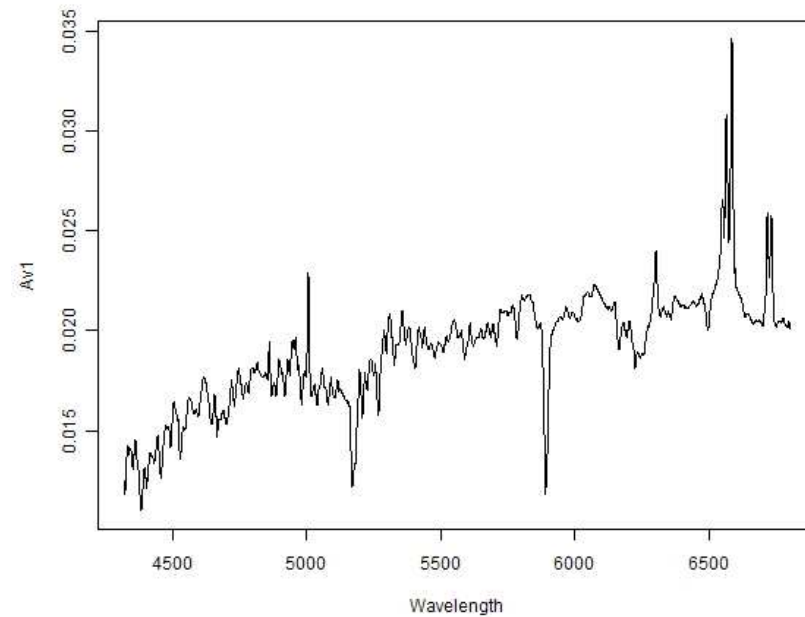
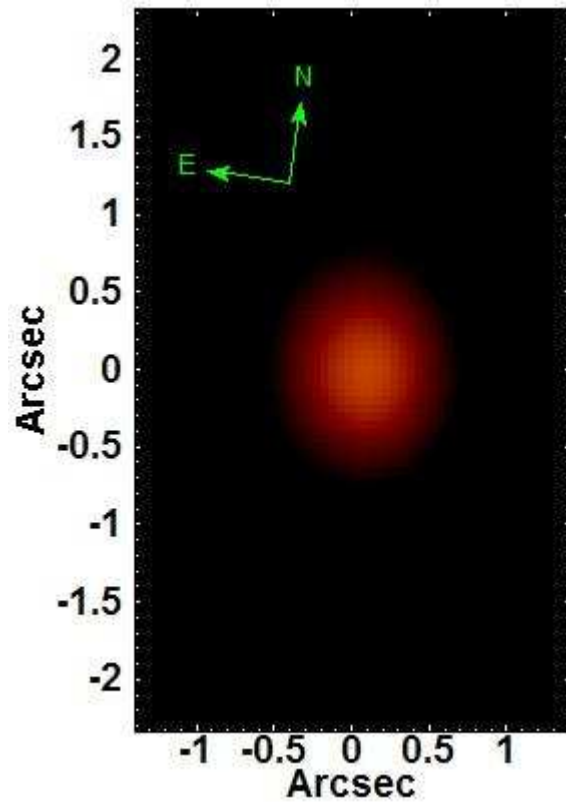
Eigenvector	Variance (%)
1	99.5256
2	0.3849
3	0.0464
4	0.0212
5	0.0059
6	0.0046
7	0.0038
8	0.0012
9	0.0009
10	0.0008

Scree test – Indicates that until Eigenvector 8 we have useful results



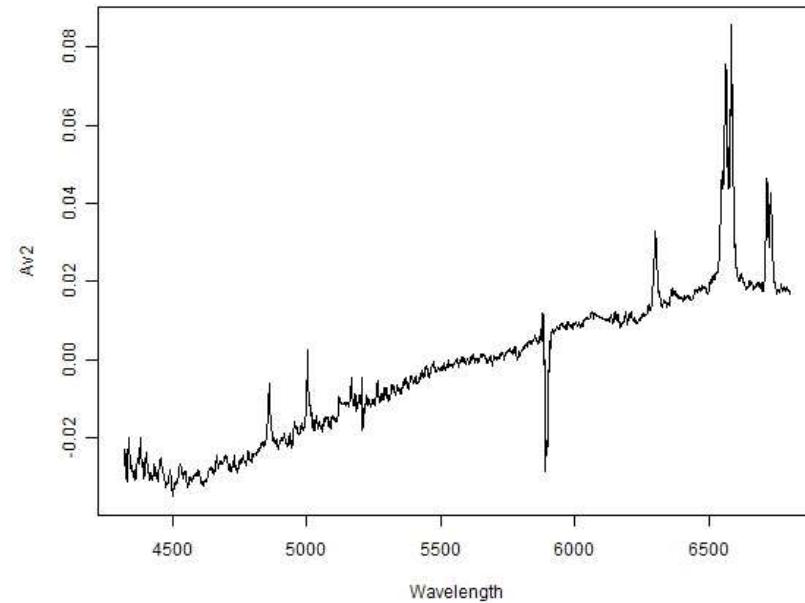
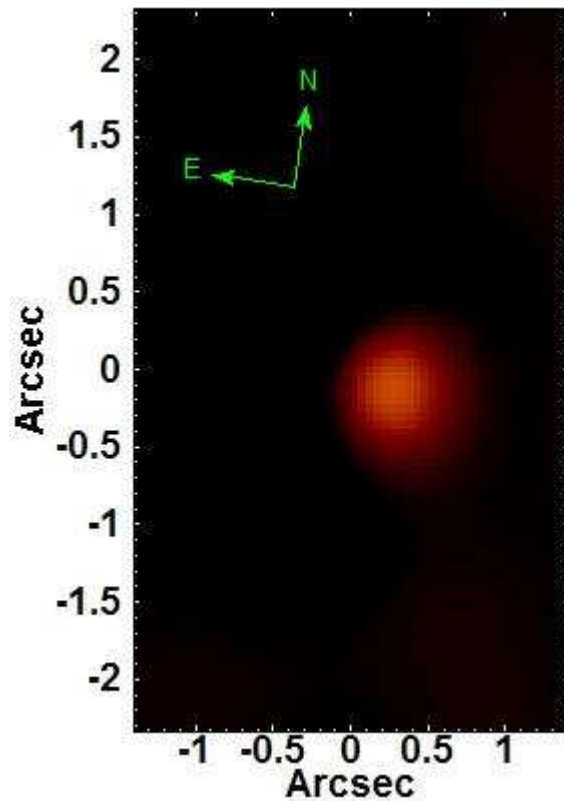
NGC 7097: Eigenvector 1 (99.52%):

Mainly the galaxy Bulge



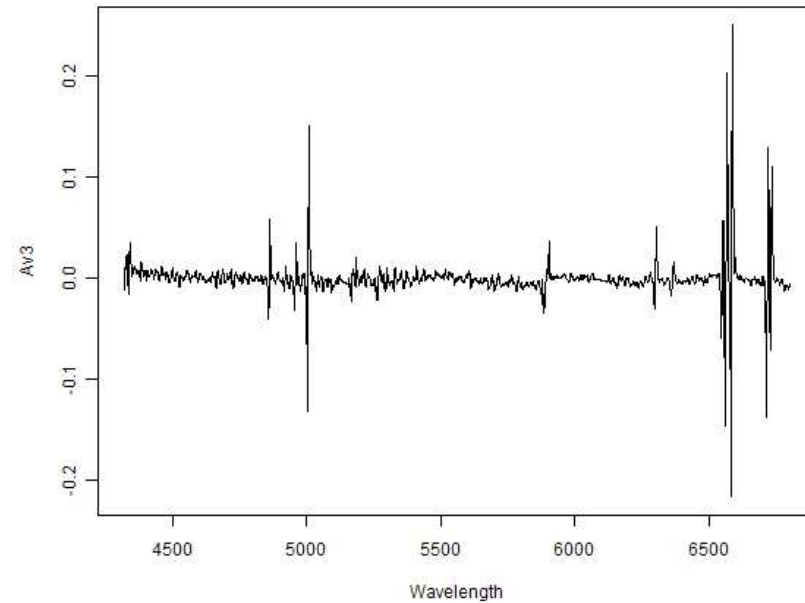
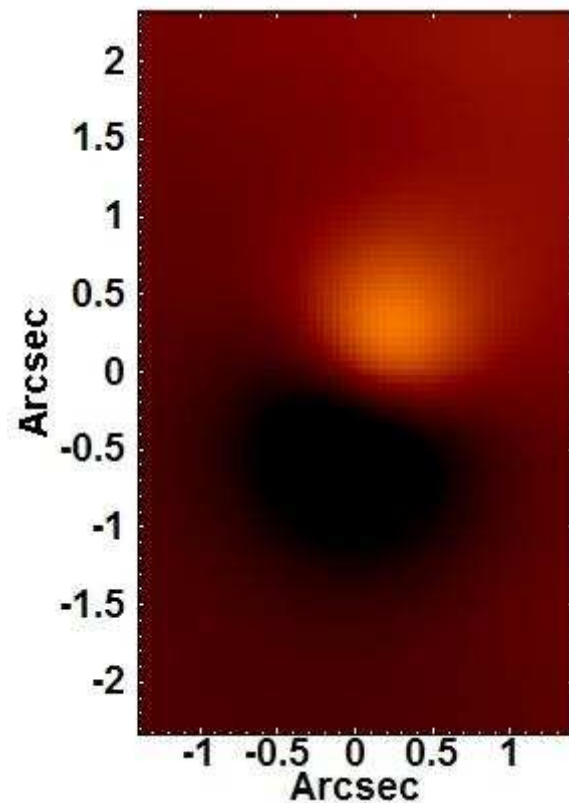
NGC 7097: Eigenvector 2 (0.38%):

LINER signature. Red component correlated with the emission line features. Interstellar gas (Na I) in the line of sight to the AGN.



NGC 7097: Eigenvector 3 (0.046%):

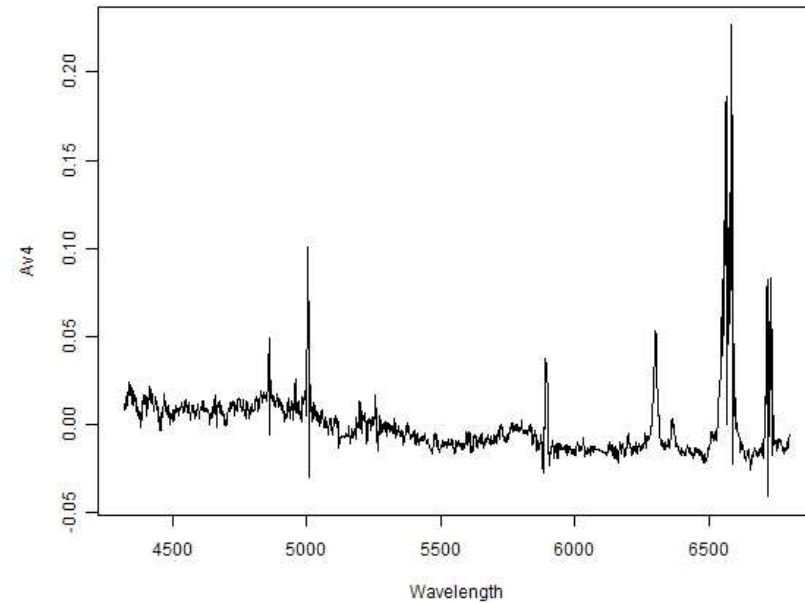
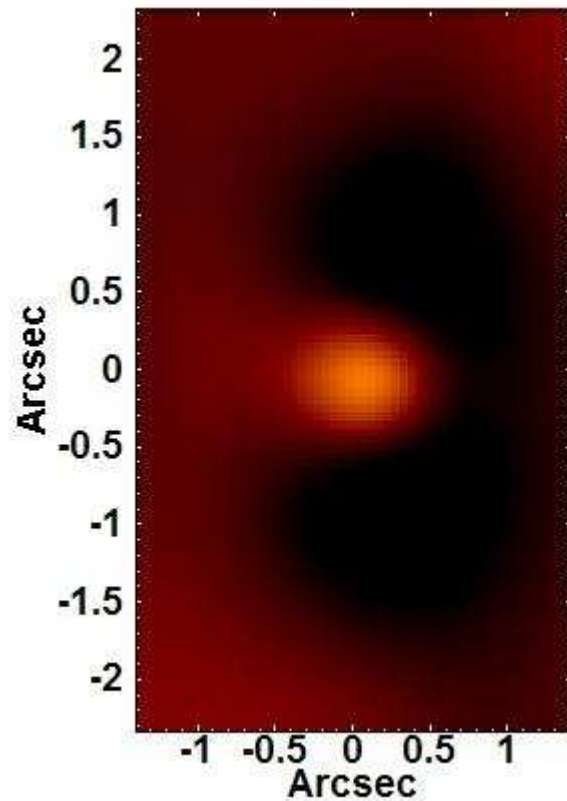
Positive correlation is the red component of the line features.
Negative correlation is the blue component of the line features.
Rotating disc



NGC 7097: Eigenvector 4 (0.021%):

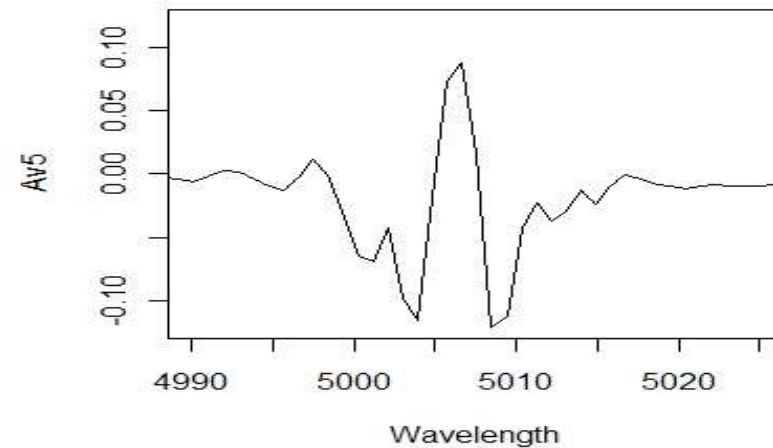
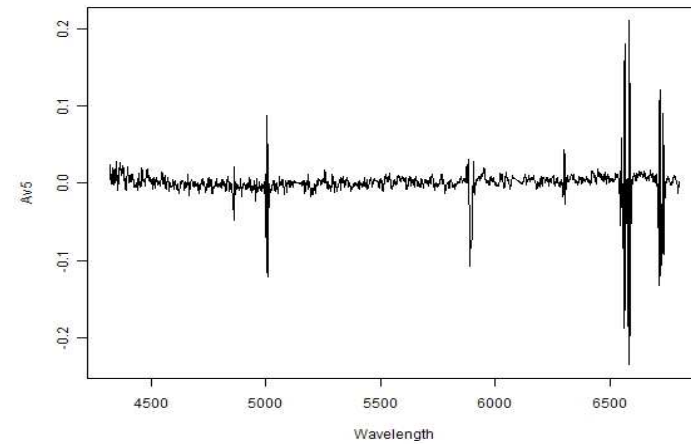
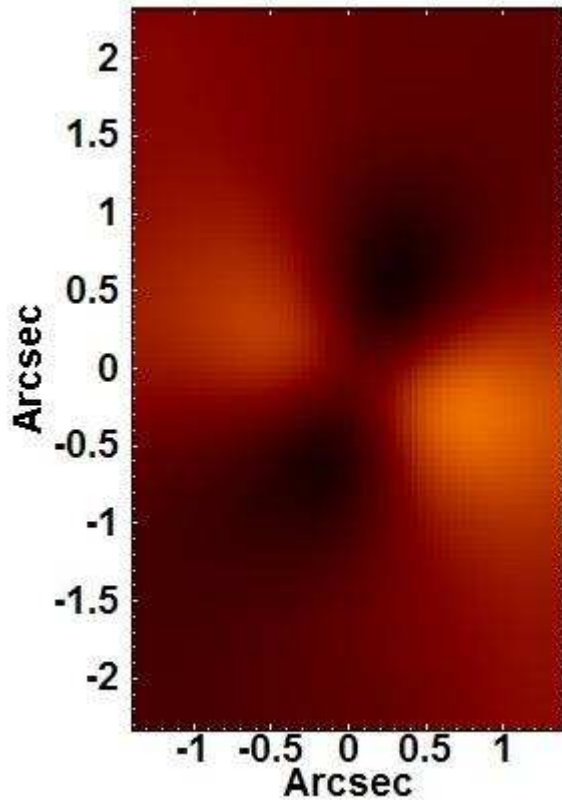
A second LINER, but bluer than the one found in Eigenvector 2 and displaced 0.15'' eastward. Absence of Na I absorption.

Same redshift as the first one.

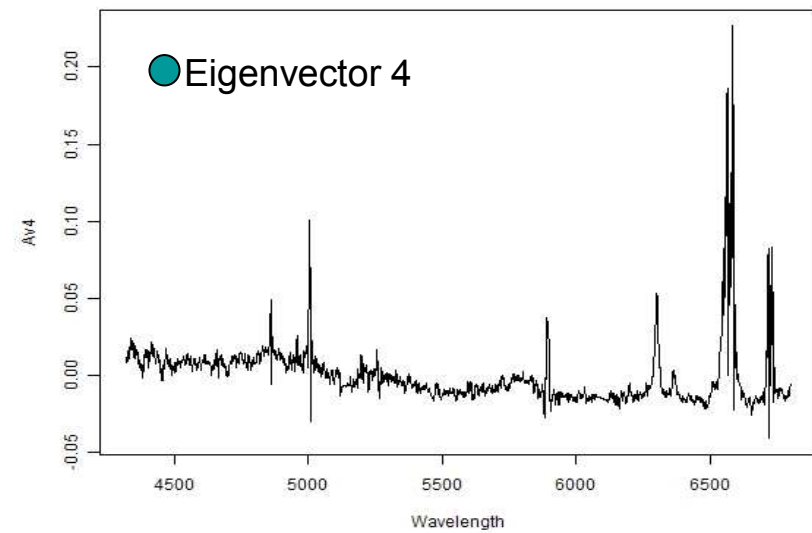
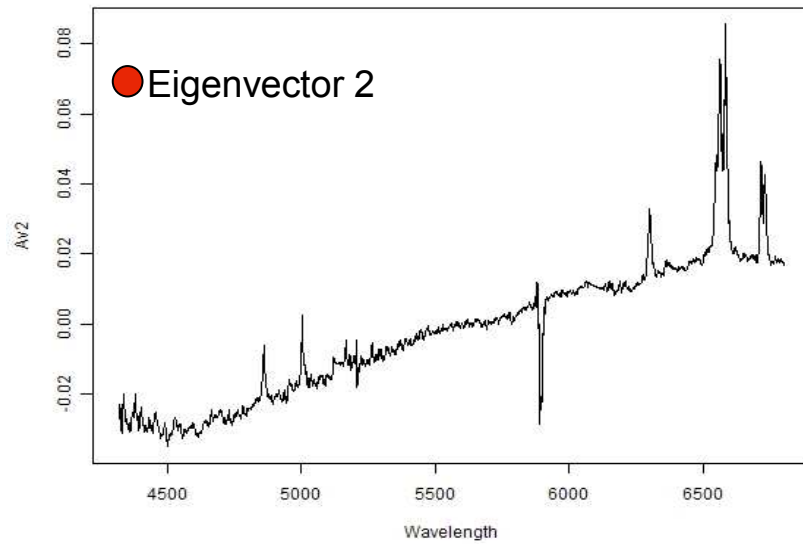
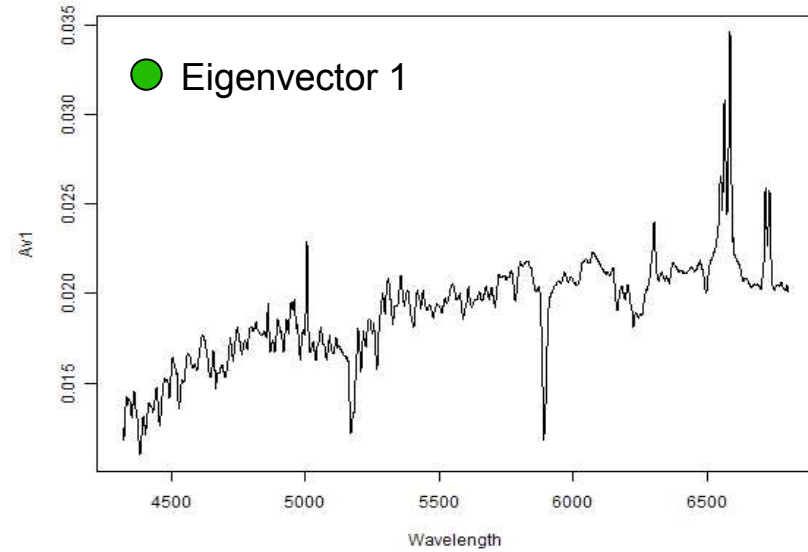
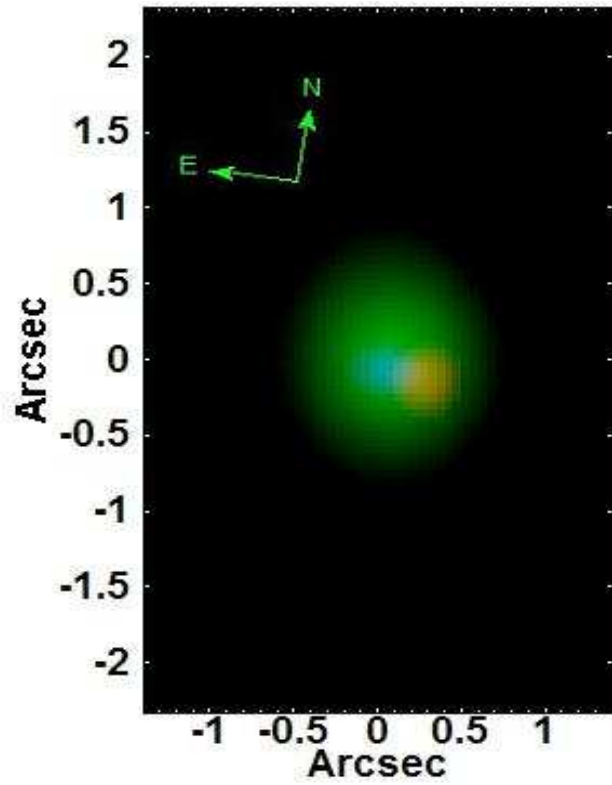


NGC 7097: Eigenvector 5 (0.0059%):

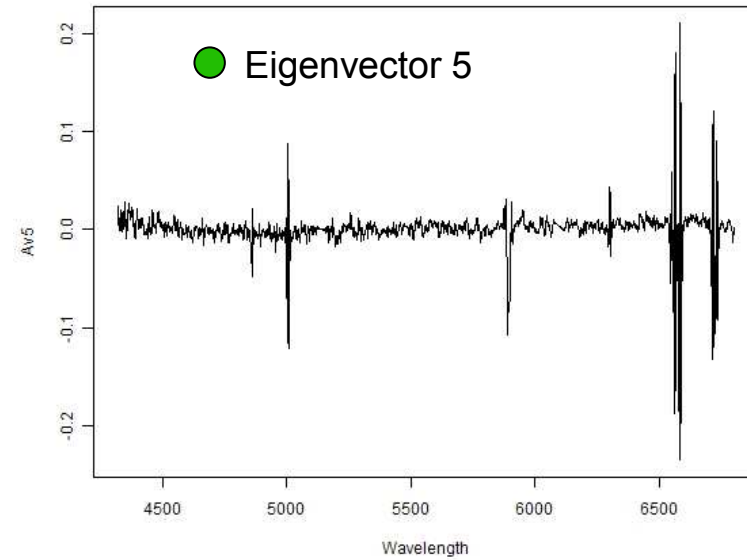
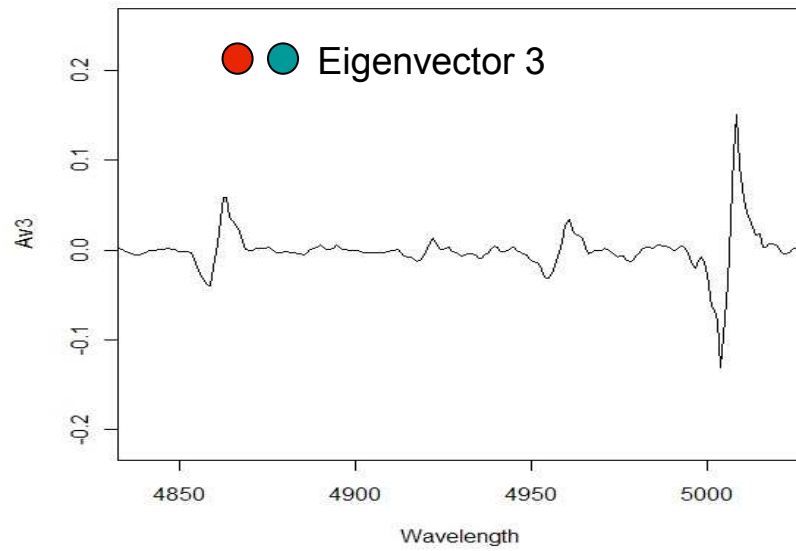
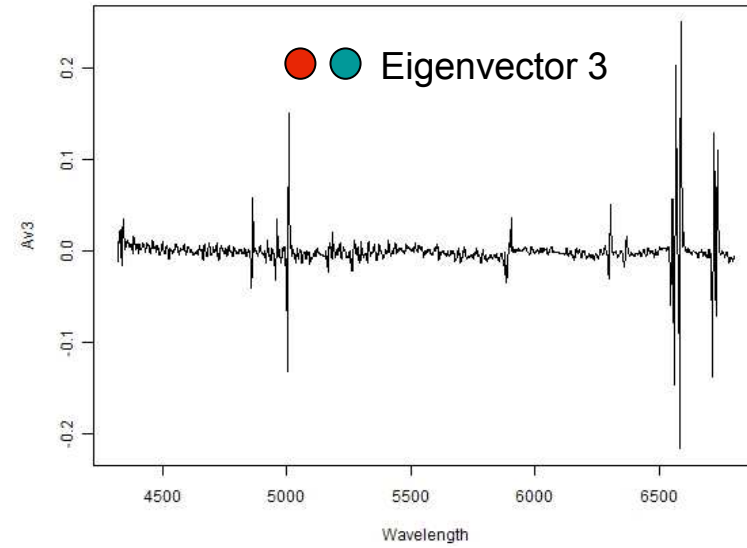
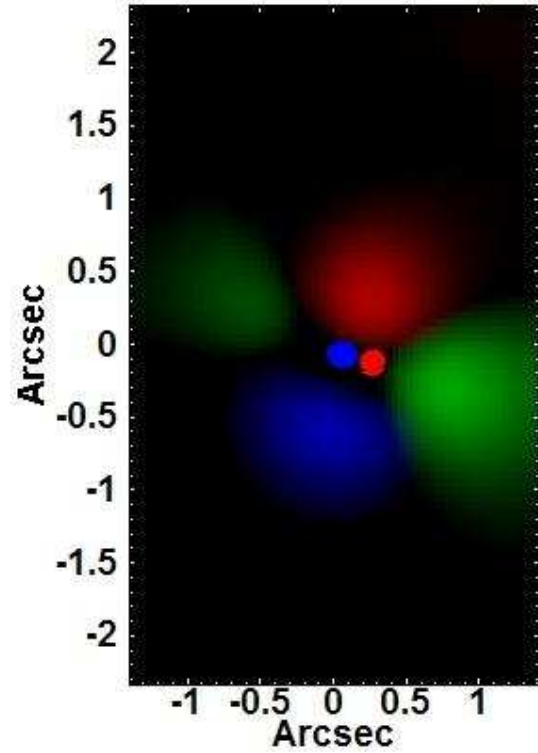
- The central component of the emission line features is anti-correlated with their blue and red components.
- Ionization cone (correlated) and rotating disc (anti-correlated).

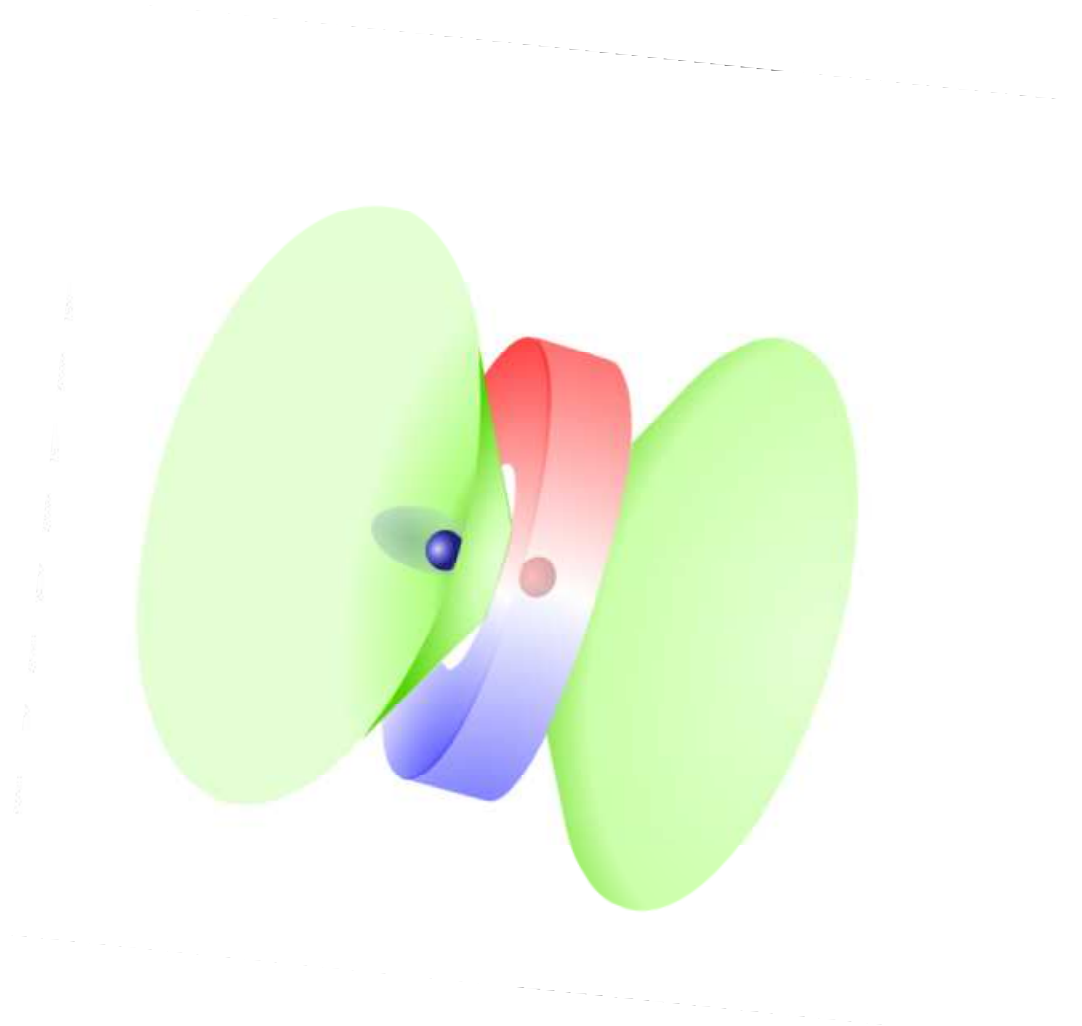
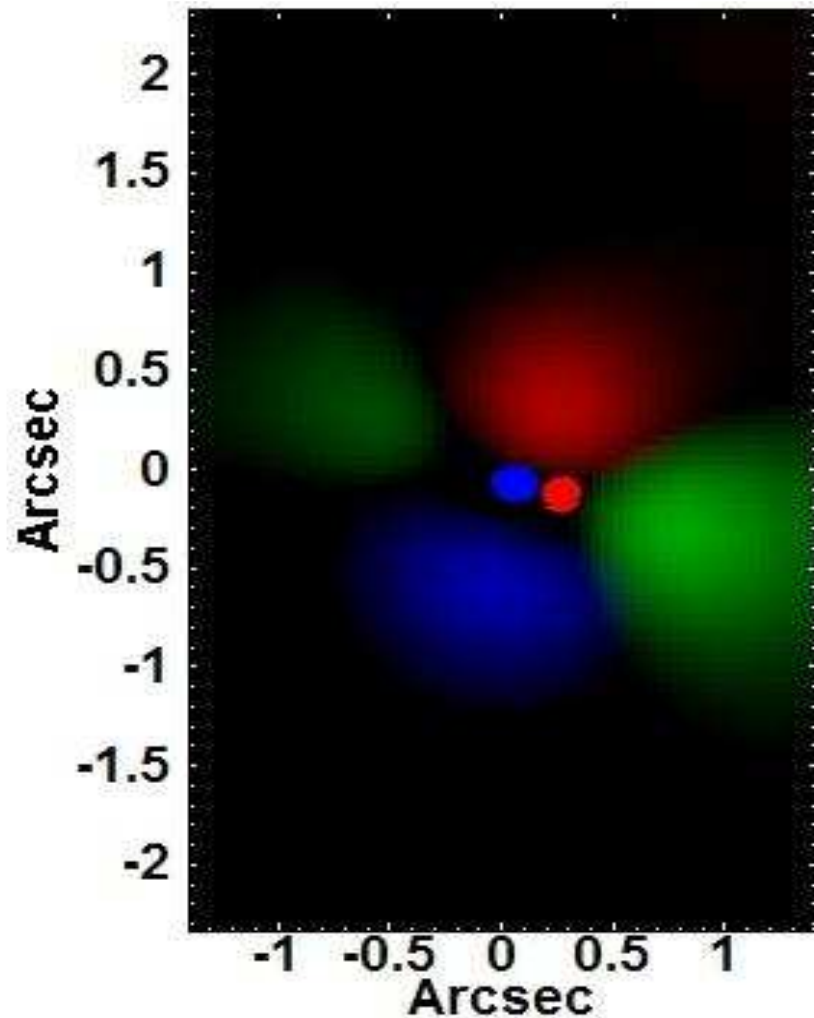


Combining Tomograms 1, 2 and 4



Combining T2, T3, T4 and T5.





CONCLUSION

- The LINER is viewed directly through the disc, reddened by dust.
- The same LINER is reflected by the clouds in the ionization cone.
- We predict that the blue component is polarized.