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A HIGH RESOLUTION SCANNING FABRY–PEROT FOR OSIRIS

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Following the directives of the workshop on the interferometric mode of OSIRIS, the Mexican team has received support to acquire a scanning Fabry-Perot interferometer for OSIRIS. In this presentation we will try to define which Fabry-Perot will be selected as well as which filters need to be acquired. We will also discuss the acquisition software.

This project consist of implementing high spectral resolution scanning Fabry-Perot (F-P) interferometry on the GTC 10 m telescope with the OSIRIS instrument and the following characteristics: field of view of 7 x 7 arcmin, pixel size 0.125 arcsec and R up to 20,000.

It would be installed within the OSIRIS collimated beam in the filter wheel hosting the tunable filters. ICOS ET100 scanning F-P can be used with OSIRIS tunable filters CS100 as well.

There are only two similar instruments actually operating in large telescopes:

1. KYOTO 3D at SUBARU
2. PFIS at SALT

With a field of view of 2 and 3 arcminutes respectively. A Fabry-Perot upgrading in OSIRIS would give us a field of view in the order of seven to eight arcminutes. It would be an unique instrument for a large variety of problems requiring a large field of view.

According to scientific projects previously discussed in the workshop on the interferometric mode of OSIRIS, (Rosado 2005) at least two F-P (high resolution R=20000, low resolution R=5000) would be required. Both should be simultaneously optimized in two spectral ranges:

from 6300 to 7000 (galactic projects) and
from 8000 to 9500 (OTELO objects kinematics)

Fixed gap, low order F-P interference filters would also be required to act as band pass filters for isolating specific lines. They will be installed at OSIRIS second filter wheel. The required diameter size is between 16 to 19 cm.

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TABLE 1

FABRY-PEROT RESOLUTIONS

R	Velocity resolution	Free spectral range
20000	15 $km\ s^{-1}$	600 $km\ s^{-1}$
5000	60 $km\ s^{-1}$	1000 $km\ s^{-1}$

Astronomy that can be done with this instrument: kinematics of star forming regions (HH objects, proplyds, large-scale flows etc.), dynamics of isolated and interacting galaxies (resonances, galaxy pairs, compact groups), and kinematics of OTELO objects.

There are several acquisition software considerations to be defined like: synchronizing F-P scanning with image acquisition, data cube assembly; single frame or data cube files would be provided according to the observer data reduction process. F-P plates parallelism is extremely important to improve Finesse, F. Our team has developed a very efficient algorithm to accomplish this task.

M. Rosado has obtained financial support from CONACYT to buy one single F-P. The following characteristics and specs need to be determined before bought is done: wavelength range, resolution, order-isolating, filters set and deployment plan.

We have two questions. Do our Spanish partners have the funds required to purchase another F-P? Is there any one else interested in such a joint-partnership? The first one involves one F-P interferometer only. If such is the case we would propose to get a F-P with a resolution in between those of the originally proposed; R=10,000. While the second one involves the acquisition of one of the originally proposed in the understanding that future purchase of a second F-P is assured.

It has been discussed whether some other participants could acquire other elements for the interferometric mode of OSIRIS.

REFERENCES

Rosado, M. 2005, RevMexAA (SC), 24, 281