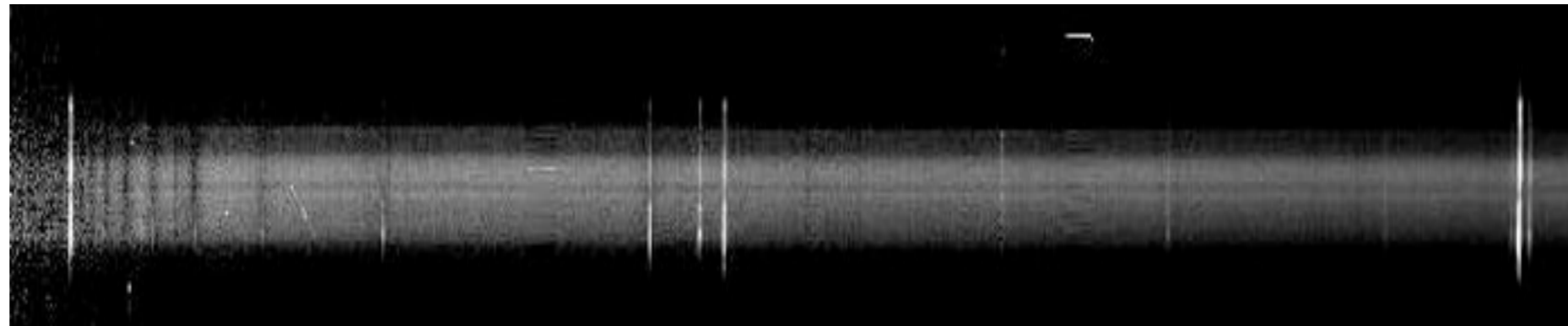


# Star Formation Histories in Lenticular Galaxies

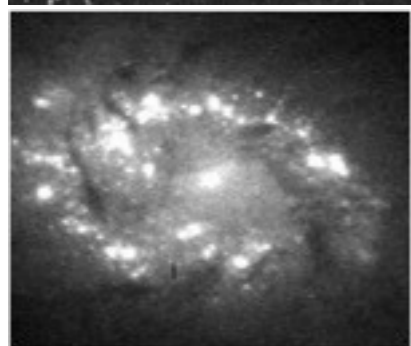
- PI - Sudhanshu Barway (SAAO)
- Co-I's - Petri Vaisanen (SALT/SAAO), Alexi Kniazev (SALT/SAAO), Ajit Kembhavi (IUCAA), Yogesh Wadadekar (GMRT) and Kaustubh Vaghmare (IUCAA)
- Proposal ID - 2010-1-RSA\_OTH\_IUCAA-001 and 2011-3-RSA\_IUCAA\_OTH-001
- PhD Thesis - Kaustubh Vaghmare (IUCAA)
- Brief Proposal Summary -  
We proposed to obtain long-slit spectroscopy with the RSS spectrograph at SALT for Lenticular (S0) galaxies with an intriguing diversity in structure and stellar content. The PG0900 grating with a 1.0" slit were used to get a  $R \sim 2000$  resolution and the  $\lambda = 3640$  to 6765 Å range which is sufficient to model the absorption and emission features in the spectra. Each target were observed for 1200-1800 sec to have sufficient SNR at the core of galaxies. Default spectrophotometric standards were observed for the kinematic analysis.
- Proposal Status - Data reduction is complete and analysis is in progress.

# Star Formation Histories in Lenticular Galaxies

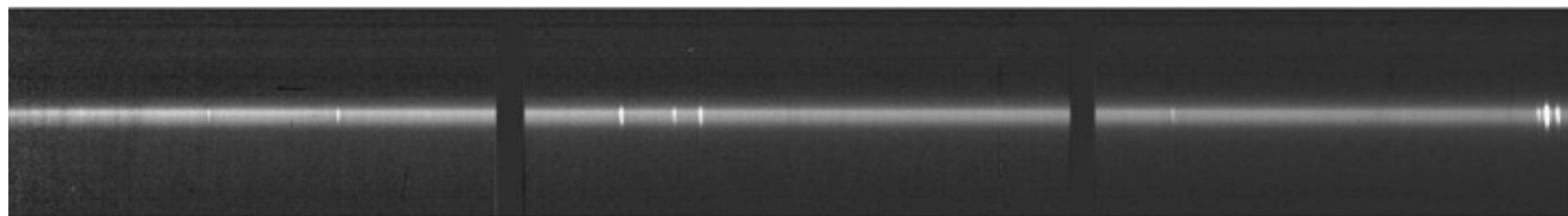
Some Examples -



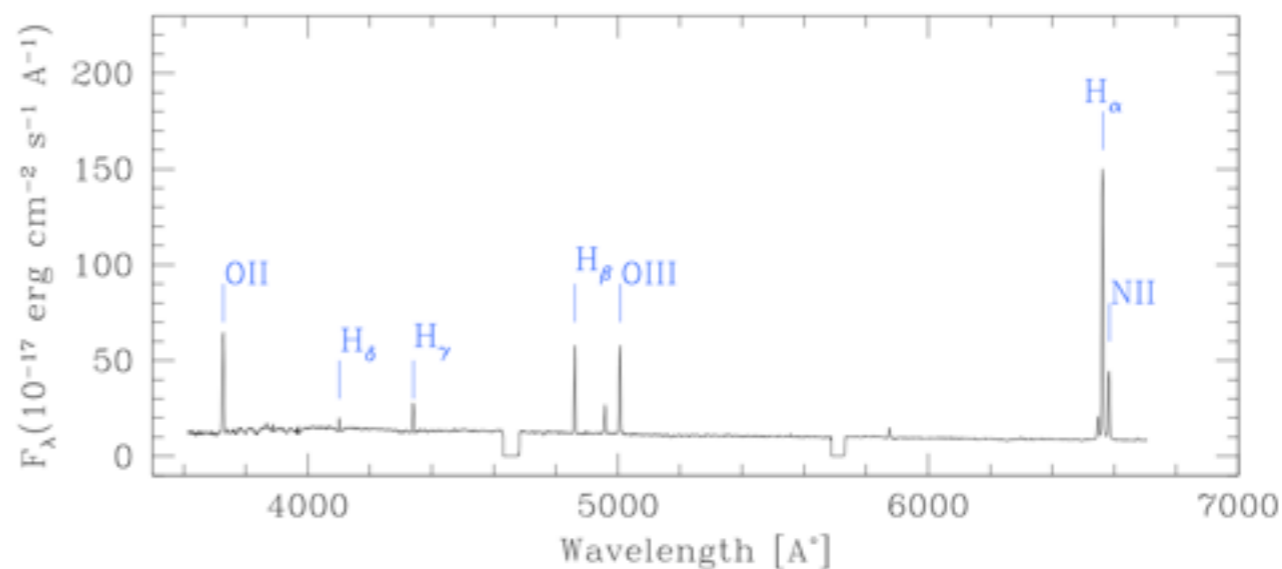
NGC 0216 – S0 galaxy with young warped star forming disk



Central 10"x10"  
from HST-WFPC2, I  
band images

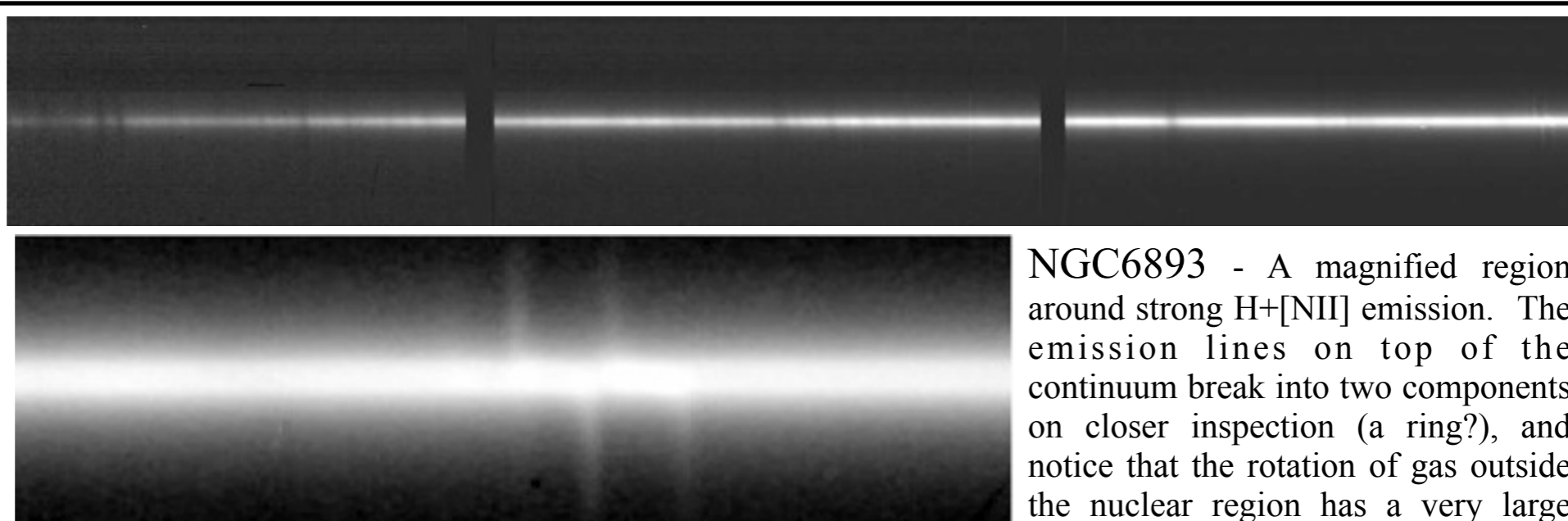


NGC 2328 – S0  
galaxy with young  
star forming spiral  
pattern or Super Star  
Clusters,

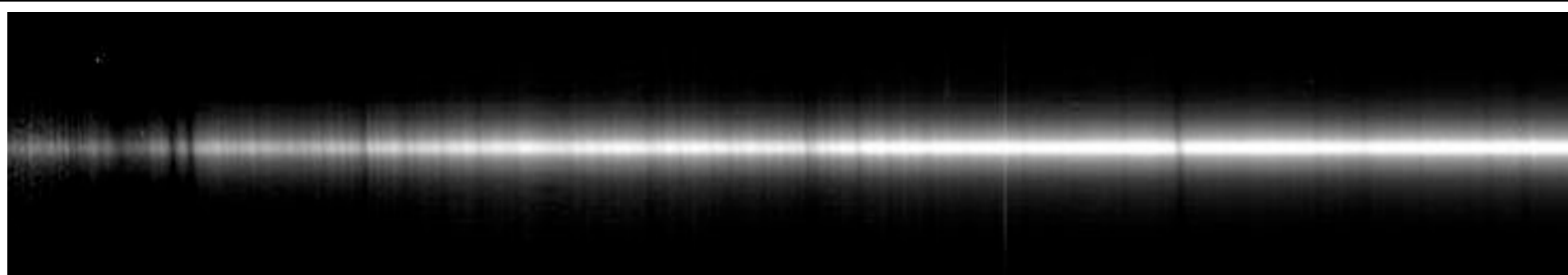


# Star Formation Histories in Lenticular Galaxies

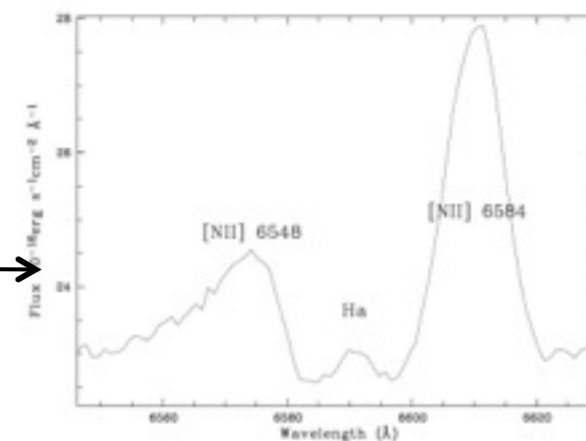
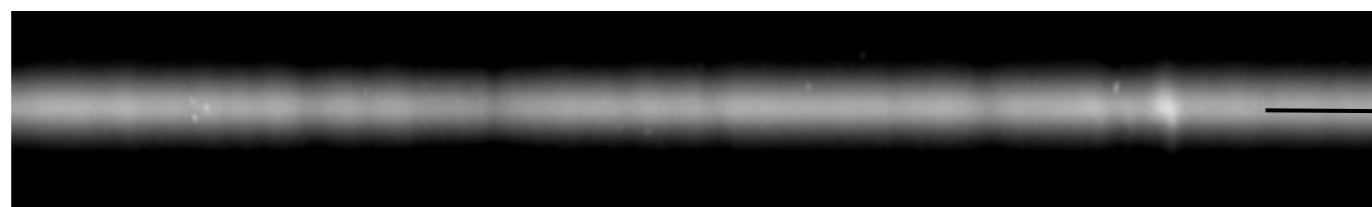
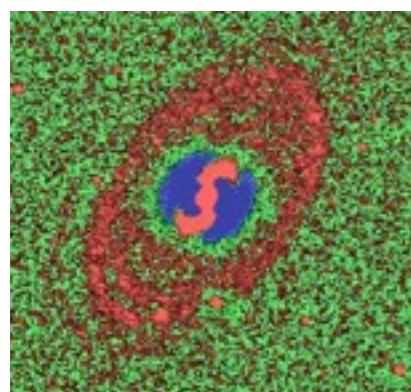
Some Examples -



NGC6893 - A magnified region around strong H+[NII] emission. The emission lines on top of the continuum break into two components on closer inspection (a ring?), and notice that the rotation of gas outside the nuclear region has a very large velocity amplitude of  $\sim 800$  km/s.



NGC 1553 – S0 galaxy with central spiral structure & rings



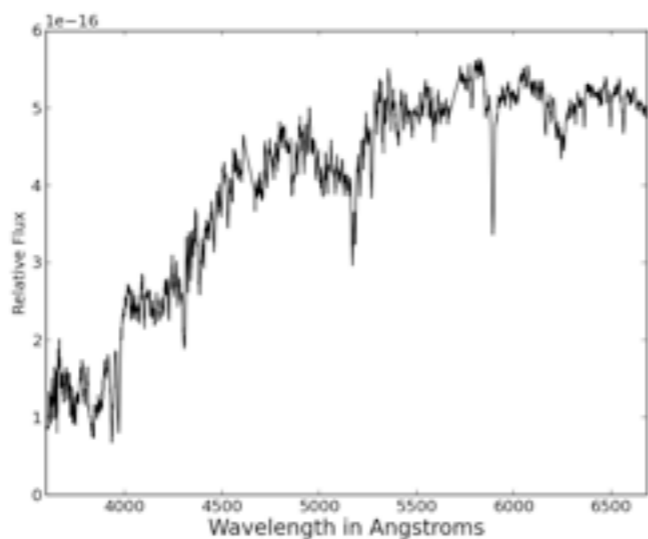
IRSF K band Unsharp mask

# Star Formation Histories in Lenticular Galaxies

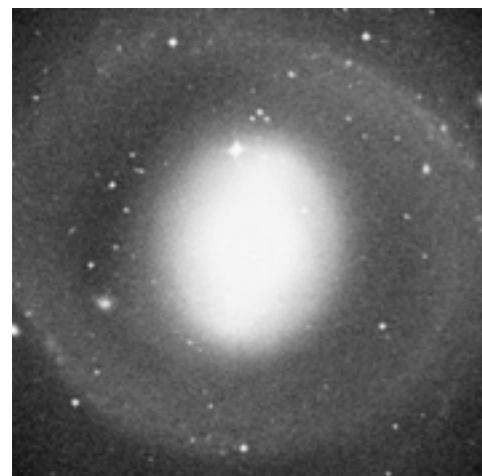
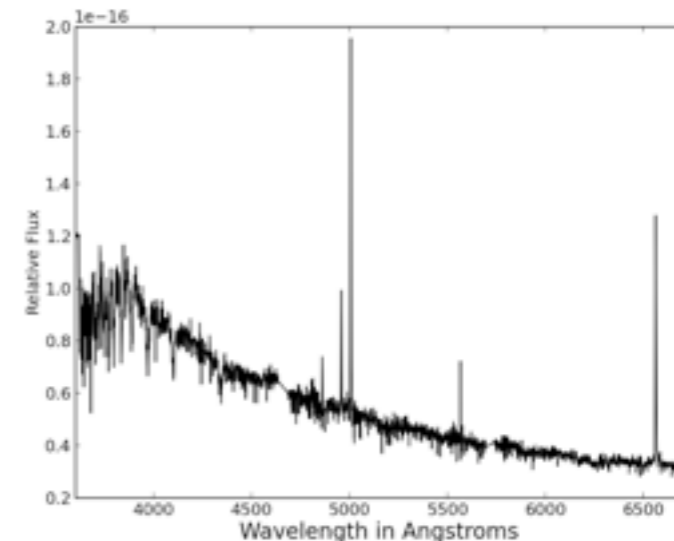
Some Examples -



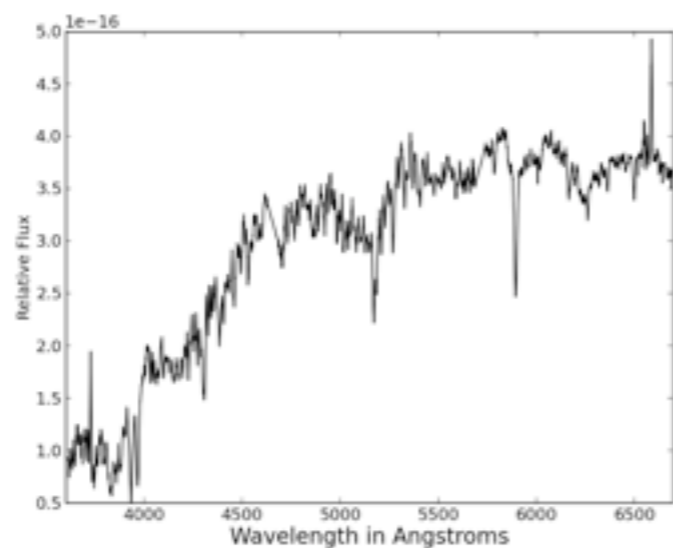
NGC1201



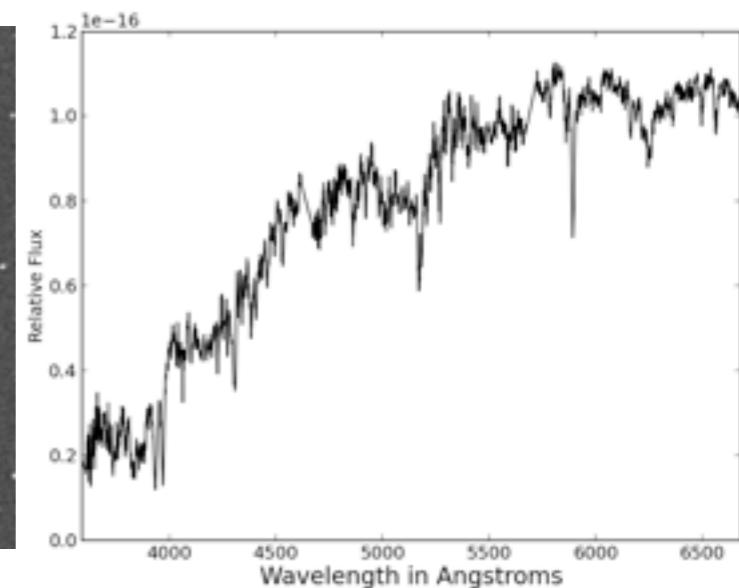
NGC1705



NGC1291

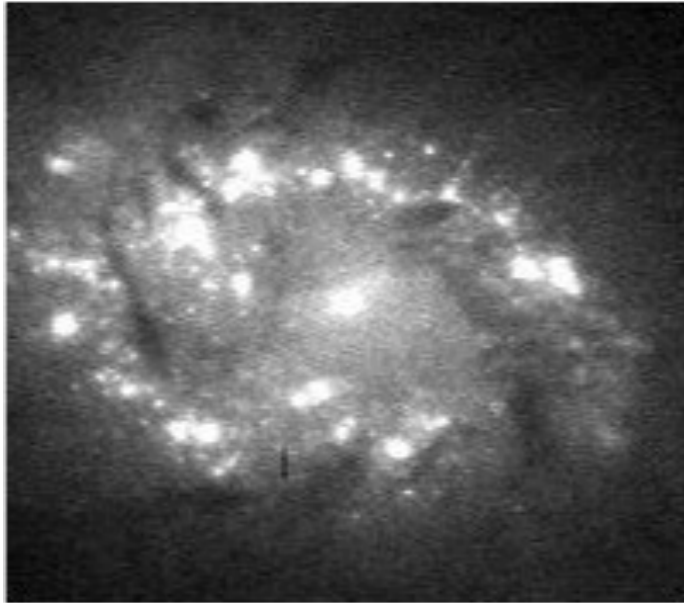


NGC1440

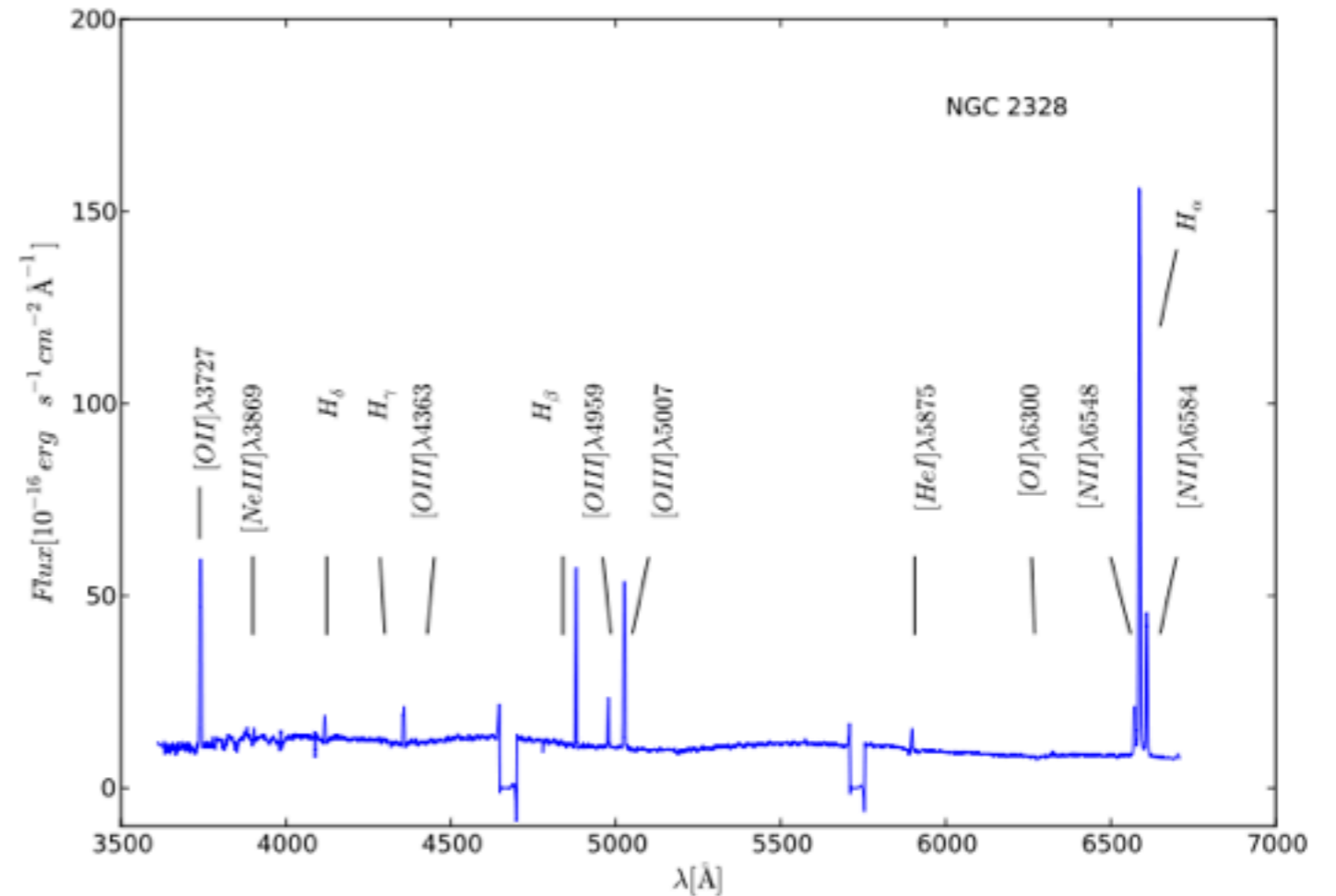


# Star Formation Histories in Lenticular Galaxies

## Analysis-



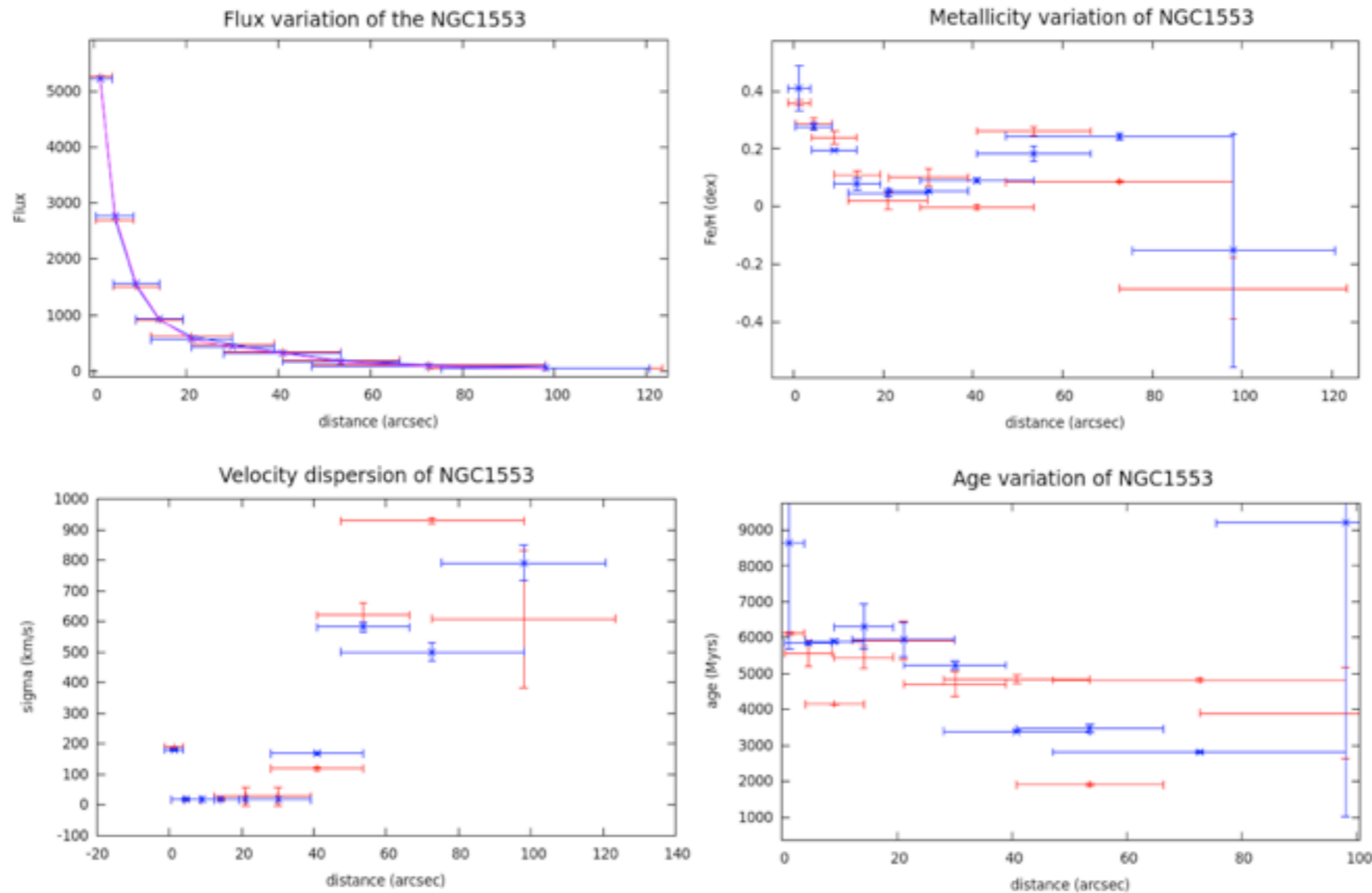
NGC 2328 - Central 10"x10"  
from HST-WFPC2, I band  
images



The spectra of NGC 2328 showing the detection of emission lines (including 3727[OII]) relevant for determination of metallicity. Analysis suggests that the metallicity of the galaxy to be 8.33 with an extinction of 0.53. We are currently in the process of analysing the long slit spectra along with HST WFPC2 (optical) and WFC3 (near-IR) data to study Super Star Clusters (SSCs), which are responsible for the emission lines in the spectrum.

# Star Formation Histories in Lenticular Galaxies

## Analysis-

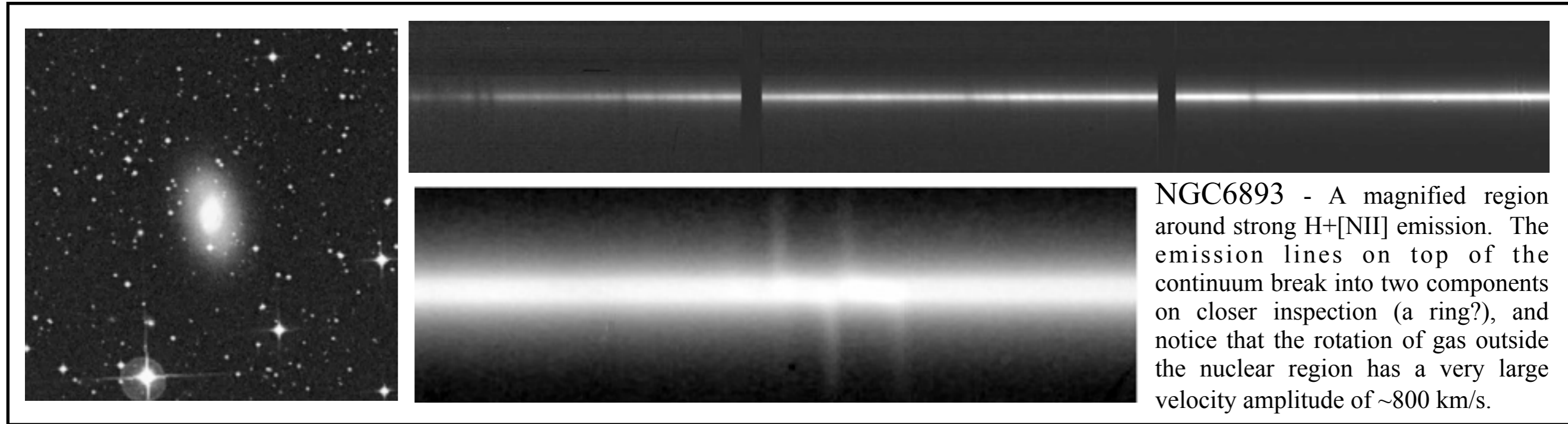


NGC1553 - Analysis of long slit RSS spectra by fitting full-spectrum Single Stellar Population (SSP) models using a package "ULySS" (Koleva et al. 2009) and flux, age, metallicity variation along with velocity dispersion is shown above. Work is in progress to determine these parameters for rest of galaxies with SALT spectra.

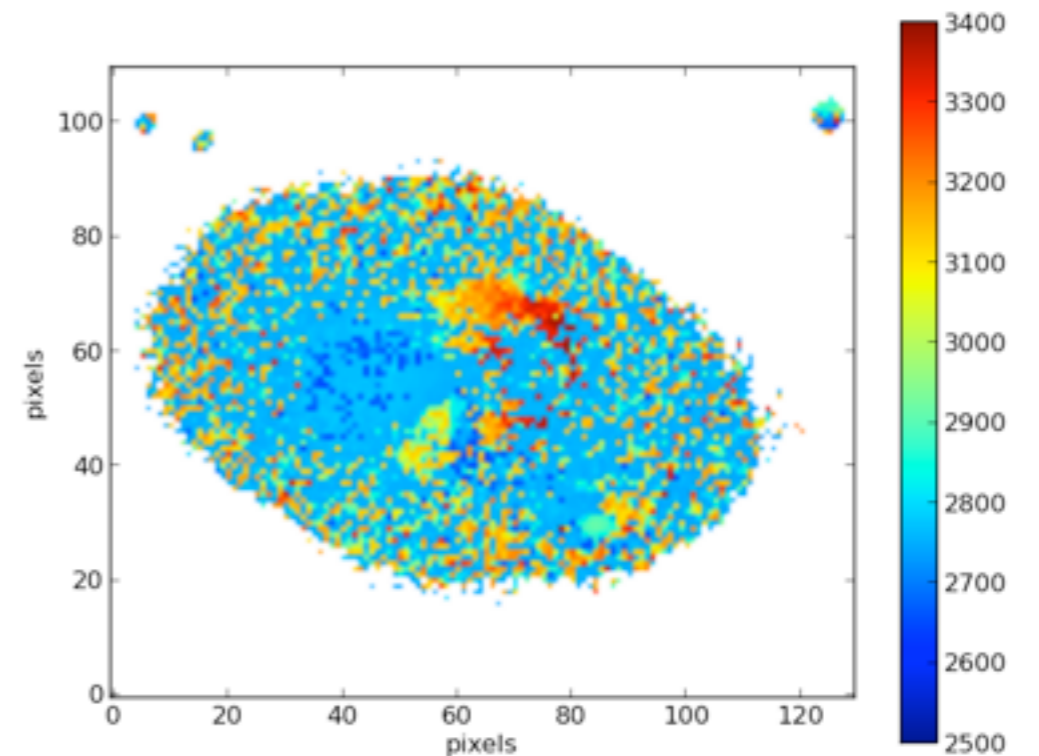
# Recent merging events - Kinematics of exotic lenticular galaxies with Fabry-Perot

- PI - Sudhanshu Barway (SAAO)
- Co-I's - Petri Vaisanen (SALT/SAAO) and Nicola Loaring (SAAO)
- Proposal ID - 2011-3-RSA-011
- Brief Proposal Summary -  
We proposed to obtain RSS Fabry-Perot (FP) imaging spectroscopy for three nearby lenticular galaxies (S0s) for which we have RSS long-slit spectra with multi-wavelength data from archive. The new FP data using H $\alpha$  emission will help us to determine the full kinematic structures and velocity fields of the selected targets, all of which show atypical morphologies in their central region. The data will be used to determine the dynamical mass of the systems, Which together with the FP kinematic information, and the ages and star-formation histories of the stellar populations derived from long-slit spectroscopy, will allow us to to constrain the dynamical and merging history of the target S0 galaxies.
- Proposal Status - FP data reduction and analysis is in progress.

# Recent merging events - Kinematics of exotic lenticular galaxies with Fabry-Perot



NGC6893 H $\alpha$  scan



NGC6893 H $\alpha$  Velocity Map