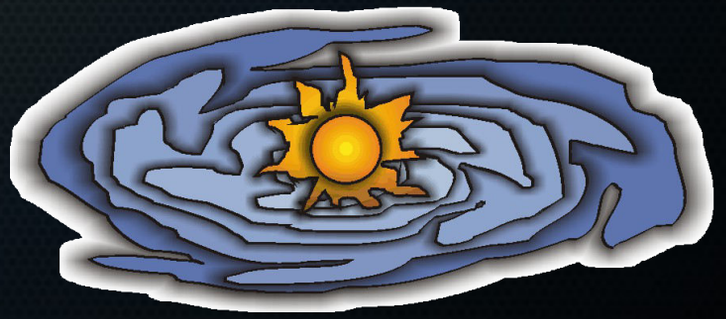
First steps of a study of the diffuse ionized gas in the CALIFA survey



Introduction

- Technical astronomer at Calar Alto Observatory
- Visitor at IAA-CSIC

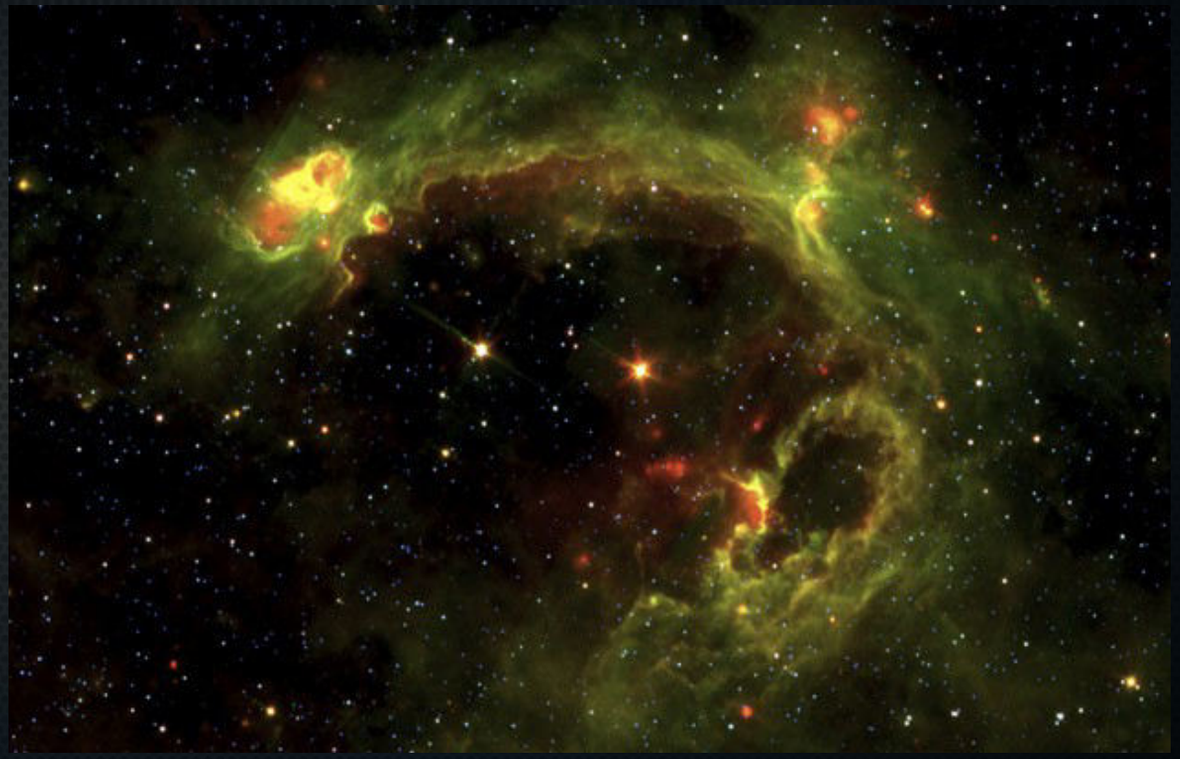
General outline: Ionized gas

- Hot gas surrounding type O stars
- No structure
- High presence of ionized atomic hydrogen → HII region

- Understanding the ionized gas help us comprehend the galaxies that contains them and the stars they surround
- The full details of star formation within H II regions are not yet well known

Diffuse ionized gas

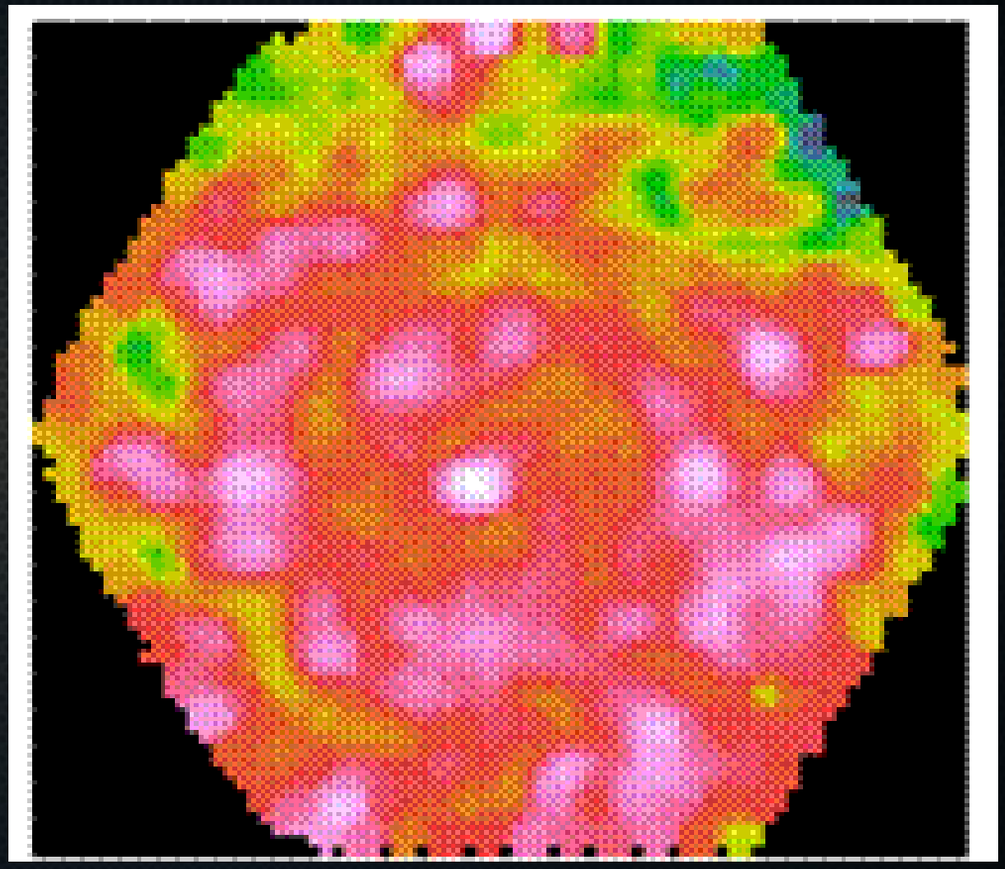
- Difficult to detect
- Mainly in HII regions
- Low superficial brightness
- Not well known

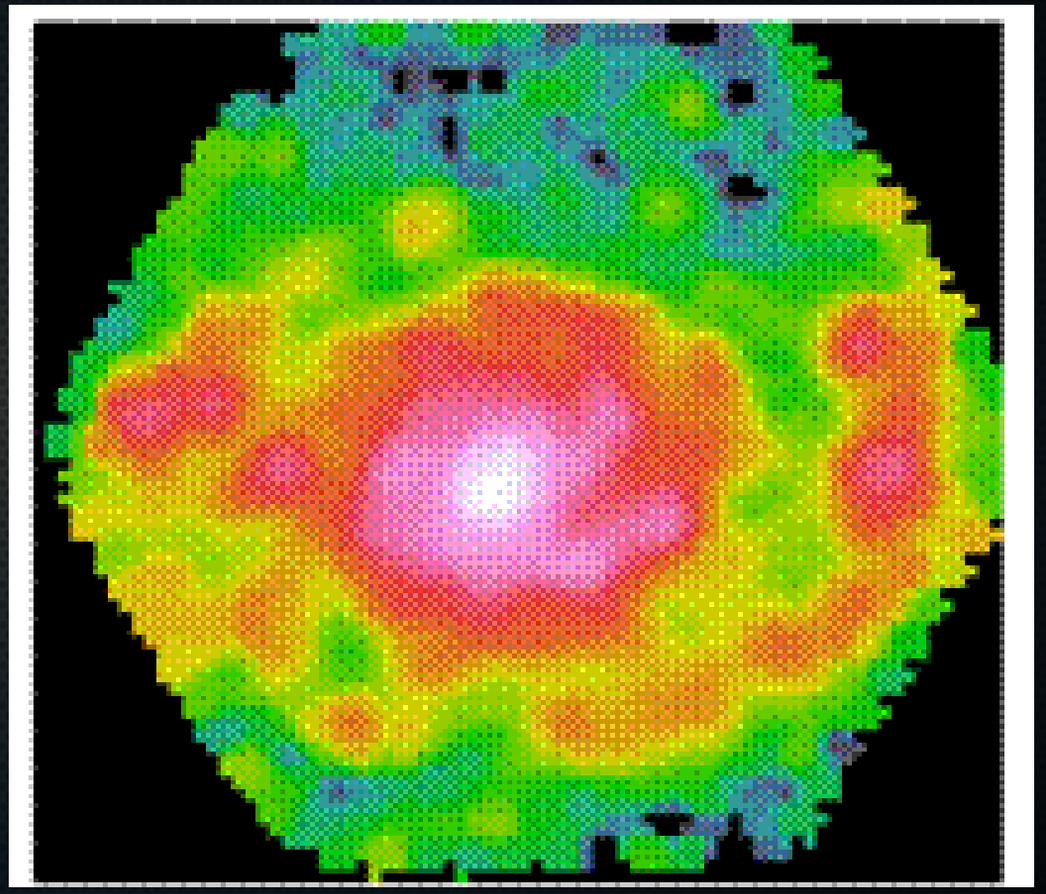


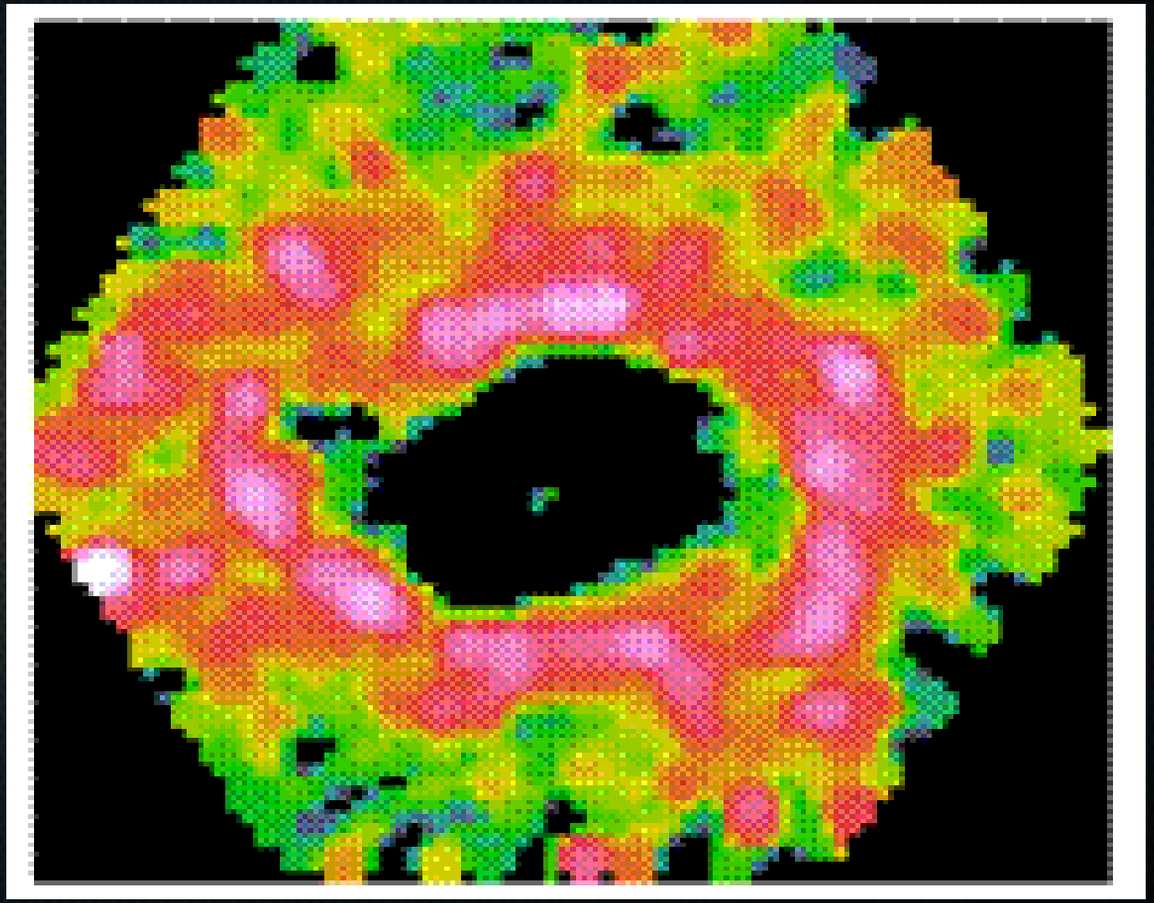
Aim of the PhD

- Study of the diffuse ionized gas in spiral galaxies
  - Fotons leak from Lyman continuum through HII regions
  - Low velocity collisions in the ISM
  - Others
- Using data from CALIFA proyect
  - Already observed and reduced
  - High statistical significance
  - Images and spectrophotometric data

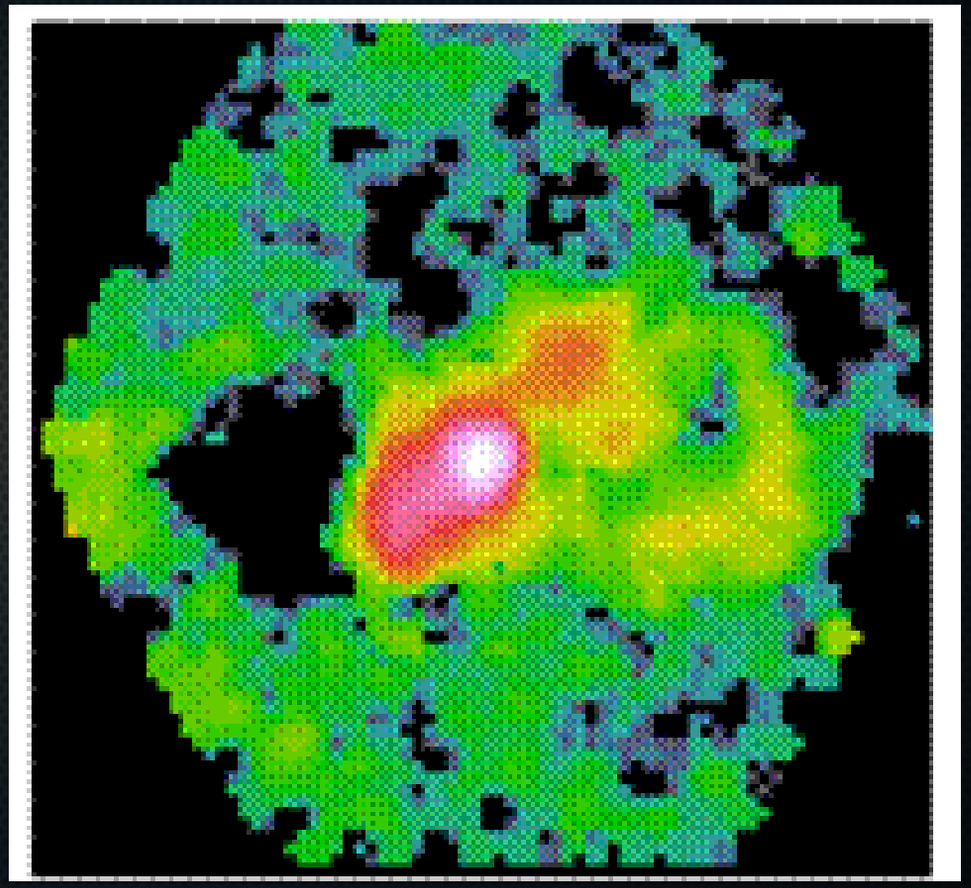
CALIFA galaxies







CALIFA galaxies



Observational

- Using CALIFA galaxies

- Characterization of the ionized gas properties
  - Spiral galaxies
  - Using the main emission lines: H_{α}, $H_{\beta,}$ [OIII], [OII], [NII], [SIII].

- Statistical study of the diffuse emission
  - Luminosity function
  - Size distribution
  - Ratio of observed spectral lines

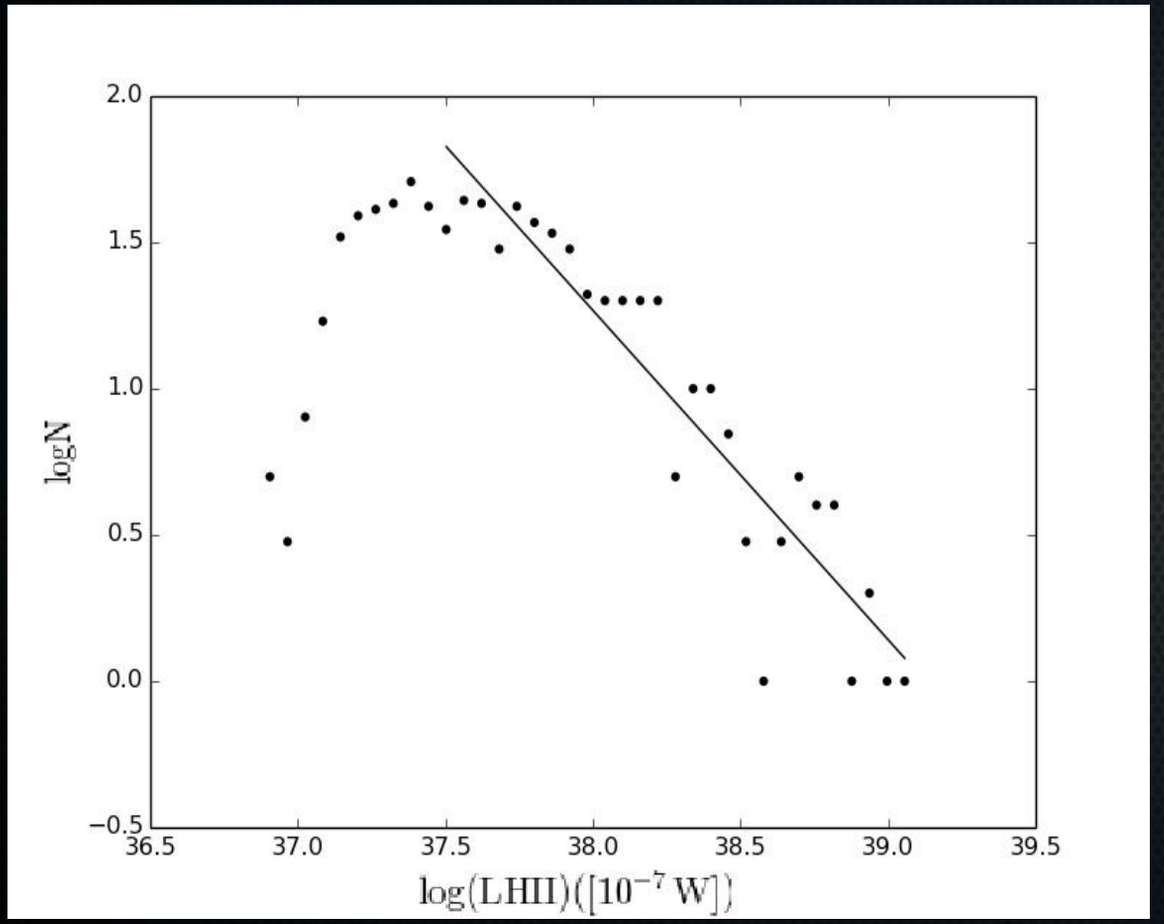
Theory

- Modelling for the diffuse component using photoionization codes with CLOUDY.

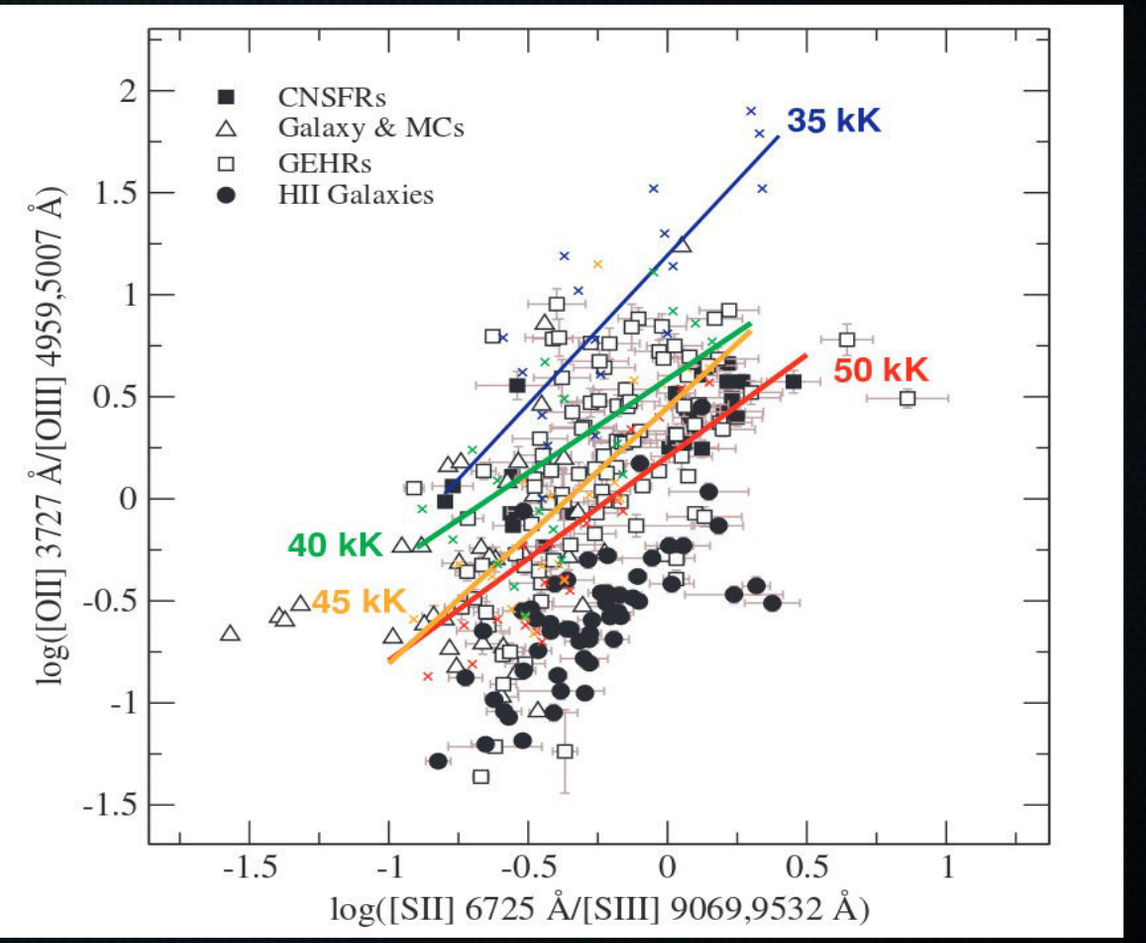
- Input: SED from bounded HII region, considering leaking fotons that ionize the diffuse medium.

- Output: evolution of the medium

Examples



Observational



Modelling

Summary

- Ionized gas
- HII regions
- Observational
  - Characterization
  - Statistics
- Theory
  - Photoionization models