CHIIS-BURGER: CLOUDY simulation of HII around StarBURst Galaxy Emission Region

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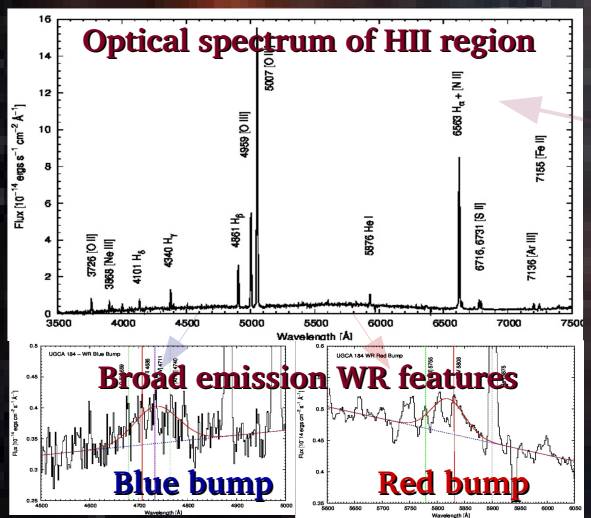
Introduction

Wolf – Rayet starburst galaxy

A subset of HII galaxies whose integrated optical spectra show Broad emission line (HeII, CIV) features. They are special type Of starburst galaxies where massive star formation is only few Myr old (Schaerer et al. 1999). The broad emission features as Shown in Figure. (1) attributed to the presence of Wolf – Rayet Stars (Conti 1991).



The optical spectroscopic Observation is done from HFOSC mounted on 2-m Himalayan Chandra Teles -cope (HCT).

Figure. (1)

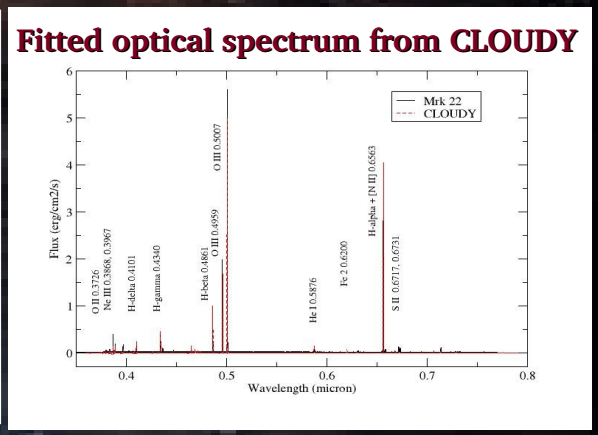
Motivation

Our main motivation is to fit the observed optical spectrum and derive the physical condition of the HII region in MRK 22, a Wolf – Rayet starburst galaxy, using spectral simulation code in CLOUDY.

Results

Figure. (2)

parameter	Log (value)
n_H	1.49 per cm^3
ξ	1.09
N_H	23.5 per cm^2
Avg chiSq	~19



We used multiple – temperature blackbody for large number Of O-type stars responsible for HII region in galaxy with follo -wing environments -
(i) Abundances : HII region gas abundance, (ii) Grains : Orion

Discussions

Our methodology was to use various grain models and incident fields (Blackbody, Starburst model etc), and optimize all the other parameters to match the predicted line fluxes with the observed Spectrum. Initial density and temperature conditions were provi -ded based on characteristic line ratios.
Our various experiment with cloudy's inbuild *phymir* algorithm used for optimization concluded the limit of 2N parallel threads (where N is No. of free parameters) at a time for computation is a major limitation. We are currently implementing *a particle swarm optimization* and *cuckoo search optimization* to implement embarrassingly parallel optimization with pyCloudy.

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