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UV Continuum and Emission Line Variability study of Mrk 841 using IUE data

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Abstract

Seyfert galaxies and quasars are the most interesting objects among the different types of active galaxies as they show the continuum and line variability over a long range of wavelength and time scales. The long term observations at the UV wavelength region would be useful in understanding the possible correlations among accretion disk properties with the physical conditions in BLR regions. In this paper, we present our results on the long-term continuum and emission-line variability studies on Mrk 841, a bright nearby active galaxy using the IUE's spectroscopic data from 1978 to 1993. The final archival data has helped us to characterise the continuum and the emission line variability observed nearly over 15 years. We have obtained R_{max} values as 2.24, 2.04, 1.87, 2.28, 1.30, 2.31, 2.17, 3.59, 2.01 and F_{var} (in %) parameters as 27.33, 26.34, 26.37, 26.41, 10.73, 23.00, 23.80, 41.26, 60.20 corresponding to the continuum windows centered at 1340 Å, 1455 Å, 1710 Å, 1800 Å, 2225 Å, 2425 Å, 2625 Å, 2875 Å, and 3025 Å respectively. Similarly, we have found the 1.78, 2.21, 2.03, 2.76, and 22.79, 53.58, 24.31, 32.63

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values for R_{max} and F_{var} (in %) corresponding to the strong emission lines like Ly α, N V, C IV, and Mg II respectively. We conclude that the UV continuum source is spatially stratified and BLR lies at greater distance from the central radiative source on the basis of the higher variability amplitudes obtained in the continuum fluxes than the strong emission lines. The C IV/Ly α and C IV / Mg II line flux ratios are found to be 0.77 and 5.08, wherein the C IV/Ly α ratio is higher than theoretical value of 0.63 predicted by the standard model of Kwan and Krolik (1981).

Keywords: Active Galactic Nuclei, active galaxies, continuum flux, emission line flux, relative variability amplitudes, normalised excess variance, light curve, line flux ratio

1. Introduction

Active Galactic Nuclei (AGNs) or active galaxies are a class of highly compact (r < 0.1 pc) and luminous sources (L_{bol}> 10^{42} erg/s; Edelson et al., (1996). The continuum luminosity of these galaxies is higher by several orders of magnitude than the normal galaxies it outshines the total luminosity emitted by their host galaxies. The physical processes occurring in these spatially unresolved compact nuclear regions and the line continuum flux variability associated with them is not well understood yet. Seyfert 1 galaxies are an interesting class of active galaxies among all active galaxies. A typical geometrical picture of AGN consists of a centrally located supermassive black hole surrounded by an accretion disk, with or without the presence of relativistic jets. The line - continuum variability studies are essential to understand the physical processes at the extreme physical conditions in the active galaxies. The broad band radiation emitted by AGNs spans from radio waves, microwaves, infrared, optical, ultraviolet (UV), X-rays, and gamma rays. Hence, simultaneous multiwavelength studies of AGNs over reasonable time-scale is needed to understand the physics of active galaxies. UV studies of active galaxies are especially important in understanding the hot and dense environments of compact nuclear sources.

The variability in both the continuum and emission-line fluxes has been studied repeatedly in almost all wavelength regions, either in the long term or short term monitoring campaigns. Some of the active galaxies which are studied for their detailed variability include NGC 7469 by Wanders et al., (1997), Nandra et al., (1998), NGC 3738 by Glass (1992), NGC 4051 by Salvati et al., (1993), NGC 1275 by Peterson (1969); Johnstone & Fabian (1995); Punsly B et al., (2018), Fairall 9 by Morini et al., (1986); Lohfink et al., (2014) and NGC 4593 by Pal & Naik (2018) and Naik et al., (2019).

Mrk 841 is a highly variable Seyfert 1 galaxy studied mostly in the X-ray region as it is known to be a highly variable X-ray bright and radio-quiet source. More importantly it is an archetypal Seyfert 1 galaxy exhibiting a UV-excess continuum, attributable to the dominant accretion disk emission peaking at UV. Interestingly Mrk 841 has been observed simultaneously along with several other archetypal low redshift active galaxies like Fairall 9, Mrk 590, NGC 4151, 3C 273, NGC 5548, Mrk 841, QSO 1821+643 and 3C 390.3 by the International Ultraviolet Explorer (IUE) satellite along with ROSAT which had an observational lifetime of nearly 9 years and Ginga (Walter et al., (1994). Mrk 841 has been extensively studied by Nandra et al., (1998) in both X-ray and UV regions.

Earlier variability studies for both line and continuum in MRK 841 were undertaken using IUE's old spectral data processed by IUESIPS tools. In this paper, we present our results on emission line and continuum variability amplitude studies for the first time in Mrk 841 using the entire final archival data of IUE processed by NEWSIPS software tools. The continuum variability studies have been carried out at specifically identified line free UV continuum windows. Mrk 841 was observed quasi-continuously for about five years during the years 1983 to 1993, with no observations being carried out by IUE in the years 1984, 1985, 1986, 1987 and 1990.

2. Data Reduction, Methodology and Analysis

The International Ultraviolet Explorer (IUE) satellite has been one of the most productive satellites designed to study the universe in the ultraviolet (UV) region of the electromagnetic spectrum operating within a wavelength region of 1150 Å to 3200 Å. IUE was a collaborative project undertaken jointly by NASA, the UK Science Research Council and the European Space Agency (ESA) with an initial life span of only 3 years but was extended to 18 years owing to its excellent performance. During its 18 year observational lifespan in space from 1978 till its decommissioning in 1996, it has observed and monitored numerous astronomical objects either once or repeatedly over longer periods in quasi-continuous pattern. Data was obtained using the four cameras on board IUE, i.e., Long-Wavelength Prime (LWP) and Redundant (LWR) cameras (1850 - 3200 Å) and Short-Wavelength Prime (SWP) and Redundant cameras (SWR) (1150 - 2000 Å).

We have studied the data from all 29 epochs of observations of MRK 841 taken intermittently from 6 February 1983 to 10 February 1993, comprising 17 Long-Wavelength Prime and 10 Short-Wavelength Prime spectra. Using the IUETOOLS software package in IRAF, we have converted the NEWPSIPS to reduce the raw spectral data into science ready data in the *filename.fits* format. The galactic extinction for Mrk 841, as estimated by Nandra et al., (1995) is ≤ 0.02. Elvis et al. (1989) have estimated the $N_{HI}$to be 1.3×10^{20} cm^{-2}, which leads to E(B-V) to be 0.081 by considering a constraining condition that the reddening correction does not overcompensate for the 2200 Å feature and assuming that the dust in the line of sight contributed to the limiting value of E(B-V). In this study, we have used the N_{HI} values published in NASA's HEASARC database available online (HI4PI Collaboration (2016), resulting in N_{HI} of $2.01\ \times10^{20}$ cm^{-2}, yielding to a higher value of E(B-V) = 0.365. All the spectra have been brought into the rest frame by correcting all the spectra for the redshift z = 0.03642 value.

The continuum fluxes presented in this paper have been measured over several carefully chosen line free continuum windows of variable widths such as 1320-1360 Å, 1440- 1470 Å, 1690-1730 Å, 1775-1825 Å, 2200-2250 Å, 2400- 2450 Å, 2600-2650 Å, 2850-2900 Å and 3000-3050 Å. The fluxes of the emission lines like Ly α, N V, C IV and Mg II have been measured by fitting a single Gaussian profile using the interactive IRAF-deblend task by visual inspection of the local continuum. The emission line and continuum variability studies are characterised by two important parameters R_{max} and F_{var}. The estimation of these two parameters follows the procedures adopted by Vaughan et al. (2003) and Vedavathi and Vijayakumar H Doddamani (2018). The global parameters of Mrk 841 are presented in Table 1 along with the data of log of observations for the quasi-continuous monitoring campaign of Mrk 841 by IUE in Table 2. A sample of IUE's LWP and SWP spectra of Mrk 841 for the highest continuum flux is given in Figure 1.

Table 1: Global Parameters of Mrk 841

R A	Declination	Z	D_L	E(B-V)	Apparent Magnitude
hh :mm :ss	o : ′ : ″		Mpc	Mag	Mag
15:04:01.2	+10:26:16.15	0.03642 ± 0.00012	163.76 ± 11.48	0.04	13.71 ± 0.07

Table 2: Log of IUE′s Observations for Mrk 841

Spectrum	Date of Obs.	UT Start Time (HH:MM:SS)	Exposure Time (Seconds)	Spectrum	Date of Obs.	UT Start Time (HH:MM:SS)	Exposure time in (Seconds)
LWR15200	06/02/1983	15:13:27	5399.63	LWP22271	18/01/1992	15:38:24	5399.63
SWP19212	06/02/1983	14:40:22	1799.65	SWP43679	18/01/1992	17:14:39	11999.51
SWP19213	06/02/1983	16:45:58	10799.79	LWP23502	14/07/1992	20:01:54	3599.85
SWP33683	31/05/1988	22:08:44	2399.72	SWP45138	14/07/1992	21:06:36	6899.58
LWP15818	30/06/1989	23:09:38	2099.49	LWP23579	24/07/1992	20:22:37	3599.85
SWP36590	30/06/1989	22:02:30	3599.84	SWP45221	24/07/1992	18:21:47	6899.58
SWP36591	30/06/1989	23:37:02	7199.82	LWP23605	30/07/1992	20:52:23	3599.85
SWP36592	01/07/1989	2:12:29	6899.58	SWP45252	30/07/1992	18:45:59	7199.82
LWP15832	02/07/1989	21:59:48	2399.72	LWP23634	04/08/1992	19:55:46	1799.66
SWP3	02/07/	19:54:09	7199.	SWP4	04/08/	17:52:22	7199.

6602	1989		82	5281	1992		82
SWP36603	02/07/1989	22:28:14	4199.50	SWP46873	02/02/1993	9:25:45	8519.55
SWP36604	03/07/1989	0:15:04	7199.82	LWP24884	10/02/1993	7:57:36	3599.85
LWP19648	25/01/1991	6:05:57	4799.57	SWP46910	10/02/1993	5:51:31	7199.82
SWP40674	25/01/1991	7:30:28	9599.67				

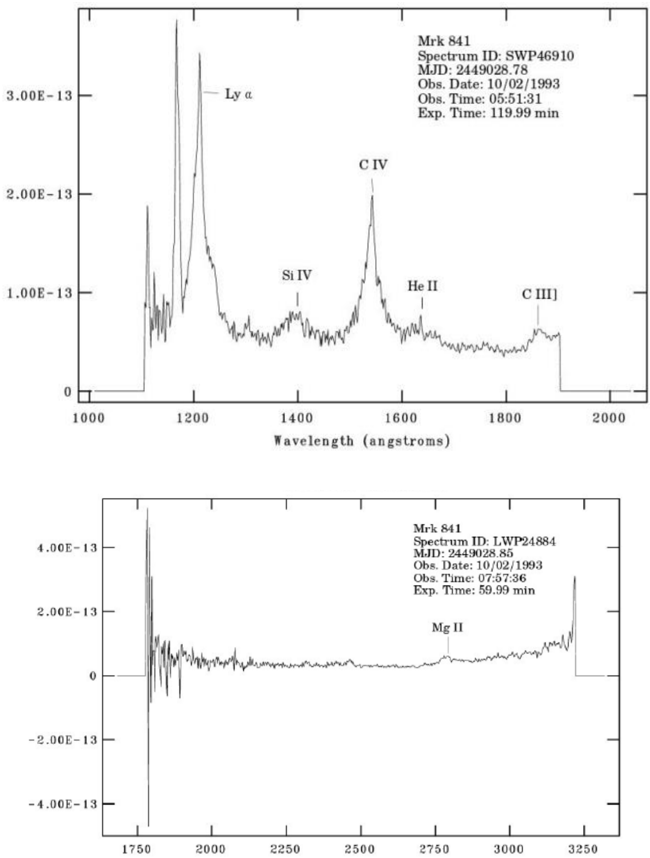

Figure 1. SWP and LWP spectra with the highest emission line flux value of Mrk 841 observed on 10 February 1993.

Table 3: Continuum and Line variability characteristics of Mrk 841 from present study

Dates of Observations	Continuum window (Å) / Emission Line	Continuum / Line Flux (min) $F_\lambda \pm \Delta F_\lambda$	Snr	Continuum / Line Flux (max) $F_\lambda \pm \Delta F_\lambda$	Snr	Continuum / Line Flux (mean) $F_\lambda \pm \Delta F_\lambda$	Mean EW (Å)	R_{max}	ΔT (~ days)	N
1	2	3	4	5	6	7	8	9	10	11
03-07-1989 / 02-02-1993	1320-1360	2.68 ± 0.01	7.17	5.99 ± 0.01	11.73	4.07 ± 0.01	-	2.24 ± 0.01	1310	15
30-06-1989 / 10-02-1993	1440-1470	2.65 ± 0.02	6.59	5.4 ± 0.02	10.29	3.90 ± 0.02	-	2.04 ± 0.01	1320	14
30-06-1989 / 10-02-1993	1690-1730	2.37 ± 0.01	9.03	4.44 ± 0.01	15.22	3.32 ± 0.01	-	1.87 ± 0.01	1320	14
31-05-1988 / 02-02-1993	1775-1825	2.12 ± 0.01	5.01	4.84 ± 0.01	10.18	3.12 ± 0.01	-	2.28 ± 0.01	1707	17
25-01-1991 / 10-02-1993	2200-2250	2.58 ± 0.02	5.05	3.36 ± 0.02	6.89	3.02 ± 0.02	-	1.30 ± 0.01	747	4
07-06-1988 / 10-02-1993	2400-2450	1.59 ± 0.01	6.46	3.66 ± 0.02	8.49	2.57 ± 0.01	-	2.31± 0.02	1708	10
07-06-1988 / 10-02-1993	2600-2650	1.36 ± 0.01	5.85	2.94 ± 0.01	9.48	2.17 ± 0.01	-	2.17 ± 0.02	1708	10
07-06-1988 / 10-02-1993	2850-2900	1.29 ± 0.01	5.83	4.63 ± 0.01	13.2	2.25 ± 0.01	-	3.59 ± 0.03	1708	10
02-07-1989 / 10-02-1993	3000-3050	1.26 ± 0.01	5.05	2.53 ± 0.02	5.64	2.16 ± 0.01	-	2.01 ± 0.02	1107	6
03-07-1989 / 02-02-1993	Ly α	28.89 ± 0.12	-	51.54 ±0.14	-	42.22 ± 0.16	81.3	1.92 ± 0.01	1310	6
03-07-1989 / 04-08-1992	N V	4.73 ± 0.12	-	10.46 ±0.14	-	7.60 ± 0.13	17.31	2.21 ± 0.06	1128	2
02-07-1989 / 14-07-1992	C IV	19.51 ± 0.09	-	39.76 ±0.09	-	29.11 ± 0.09	65.3	1.95 ± 0.01	1108	16
30-06-1989 / 24-07-1992	Mg II	3.82 ± 0.02	-	10.56 ±0.02	-	6.49 ± 0.02	32.75	2.76 ± 0.02	1119	8

Note:

Col. 1: Date of Observations corresponding to continuum and line flux minima and maxima

Col. 2: Continuum window and strong emission line features

Col. 3, 5, 7: Continuum and line flux and its errors are in units of 10^{-14} erg/s/cm^2 / Å and 10^{-13} erg/s/cm^2 respectively

Col. 8: Mean equivalent width of the Gaussian fit, Col. 9: Relative Variability Amplitude along with the error

Col. 10: ΔT- Number of days between emission line flux and continuum flux minima and maxima occurance.

Col. 11: N- Number of epochs of observations involved in computing the mean continuum and emission line flux values

Table 4: Long-term F_{var} characterization in continuum and line fluxes variations of Mrk 841 for the quasi-continuously during the years 1983 to 1993

1	2	3	1	2	3
Cont. Window Å	$F_{var} \pm \Delta F_{var}$(%)	N	Emission Lines	$F_{var} \pm \Delta F_{var}$(%)	N
1320-1360	27.33 ± 0.09	15	Ly α	22.79 ± 0.16	6
1440-1470	26.34 ± 0.15	14	N V	53.58 ± 1.23	5
1690-1730	26.37 ± 0.08	14	C IV	24.31 ± 0.08	16
1775-1825	26.41 ± 0.05	17	Mg II	32.63 ± 0.13	8
2200-2250	10.73 ± 0.35	4			
2400-2450	23.00 ± 0.17	10			
2600-2650	23.80 ± 0.14	10			
2850-2900	41.26 ± 0.12	10			
3000-3050	60.20 ± 0.2	7			

Note: Col. 1: Continuum flux windows and Line, Col. 2: F_{var} in percentage. Col. 3: N is the number of observations in the long-term monitoring period.

Table 5: Annualized R_{max} and F_{var} parameters for line and continuum flux variability in Mrk 841

Line / $\Delta_{\lambda 0}$	$F_\lambda \pm \Delta F_\lambda$ (min)	$F_\lambda \pm \Delta F_\lambda$ (max)	Mean Flux	EW (Å)	R_{max}	F_{var}	ΔT (days)	N
1	2	3	4	5	6	7	8	9
				1983				
C IV	26.48 ± 0.14	33.52 ± 0.09	30.00 ± 0.12	71.50	1.27 ± 0.01	16.49± 0.28	0.14	2
				1989				
1340 Å	2.68 ± 0.01	3.26 ± 0.02	3.04 ± 0.01	--	1.22 ± 0.01	6.63 ± 0.18	1.92	6
1455 Å	2.65 ± 0.02	3.34 ± 0.02	2.89 ± 0.02	--	1.26 ± 0.01	9.98 ± 0.28	2.03	5
1710 Å	2.37 ± 0.01	2.66 ± 0.01	2.53 ± 0.01	--	1.12 ± 0.01	4.55 ± 0.13	2.09	6
1800 Å	2.29 ± 0.01	2.52 ± 0.01	2.42 ± 0.01	--	1.10 ± 0.01	4.13 ± 0.08	2.09	6
C IV	19.51 ± 0.09	25.73 ± 0.09	21.76 ± 0.08	64.64	1.32 ± 0.01	10.69 ±0.17	1.93	5

Mg II	3.82 ± 0.02	4.90 ± 0.02	4.36 ± 0.02	26.57	1.28 ± 0.01	17.52 ±0.34	1.95	2
				1992				
1340 Å	3.02 ± 0.01	5.21 ± 0.01	4.30 ± 0.01	--	1.73 ± 0.01	20.71 ±0.15	1786	5
1455 Å	2.77 ± 0.01	5.18 ± 0.02	4.18 ± 0.02	--	1.87 ± 0.01	21.67 ±0.25	178	5
1700 Å	3.67 ± 0.01	4.34 ± 0.01	4.01 ± 0.01	--	1.18 ± 0.01	8.99 ± 0.12	10.98	4
1800 Å	2.56 ± 0.01	3.99 ± 0.01	3.35 ± 0.01	--	1.56 ± 0.01	16.52± 0.09	1786	5
2425 Å	2.57 ± 0.01	2.90 ± 0.01	2.74 ± 0.01	--	1.43 ± 0.01	5.22 ± 0.27	16	4
2625 Å	2.28 ± 0.01	2.60 ± 0.01	2.44 ± 0.01	--	1.14 ± 0.01	6.28 ± 0.20	16	4
2875 Å	2.26 ± 0.01	2.47 ± 0.01	2.36 ± 0.01	--	1.09 ± 0.01	3.68 ± 0.14	21	4
3025 Å	2.35 ± 0.01	2.53 ± 0.02	2.42 ± 0.01	--	1.08 ± 0.01	3.28 ± 0.29	16	4
Ly α	40.29 ± 0.14	50.58 ± 0.18	46.67 ± 0.17	86.85	1.26 ± 0.01	11.96 ±0.21	5	3
C IV	21.99 ± 0.06	37.96 ± 0.09	29.80 ± 0.08	64.03	1.73 ± 0.01	21.18 ±0.12	178	5
Mg II	4.61 ± 0.03	10.56 ± 0.02	7.27 ± 0.02	30.56	2.29 ± 0.01	33.98 ±0.16	11	4
				1993				
C IV	31.50 ± 0.09	33.84 ± 0.08	32.67 ± 0.08	52.60	1.07 ± 0.01	4.98 ± 0.18	8	2

Note:

Col. 1: Emission line and mid wavelength of the continuum window in Å.

Col. 2, 3, 4: Emission line and continuum fluxes for minima, maxima, and mean. The line fluxes and their errors are in the units of 10^{-13} erg/s/cm^2. Continuum fluxes, and its errors are in units of 10^{-14} erg/s/cm^2/Å.

Col. 5: Equivalent widths of emission lines.

Col. 6: Relative Variability Amplitude along with the error.

Col. 7: F_{var} in percentage.

Col. 8: ΔT is in days.

Col. 9: N is the number of observations.

Table 6: Line flux ratios in Mrk 841

Spectra obtained on Single Day	Julian Date	Date of Observation	C IV / Ly α	C IV / Mg II
SWP / LWP	244000 +			
SWP36591/ LWP15818	7708.526 / 7708.477	30-06-1989	--	5.57
SWP36602 / LWP15832	7710.371 / 7710.43	02-07-1989	--	3.98
SWP36604	7710.552	03-07-1989	0.78	--
SWP40674	8281.868	25-01-1991	0.78	--
SWP40674 / LWP19648	8281.868 / 8281.782	25-01-1991	--	5.87
SWP45138 / LWP23502	8818.42/ 8818.355	14-07-1992	--	5.53
SWP45221	8828.305	24-07-1992	0.77	--
SWP45221/ LWP23579	8828.305 / 8828.37	24-07-1992	--	3.76
SWP45252	8834.324	30-07-1992	0.78	--
SWP45252 / LWP23605	8834.324/ 8834.391	30-07-1992	--	5.34
SWP45281	8839.286	04-08-1992	0.77	--
SWP45281 / LWP23634	8839.286/ 8839.341	04-08-1992	--	5.49
SWP46873	9020.942	02-02-1993	0.77	--
		Mean	**0.77**	**5.08**

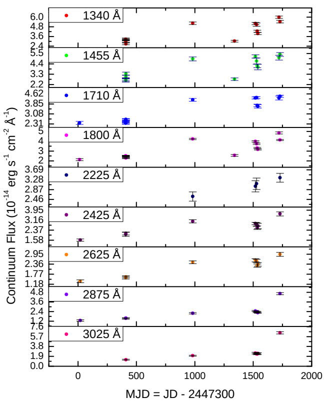

Figure 2: Light curves for the continuum fluxes of Mrk 841 for the quasi-continuous observations from 1983 to 1993. Continuum fluxes are in the units of 10^{-14} erg/s/cm^{2}/Å with corresponding error bars.

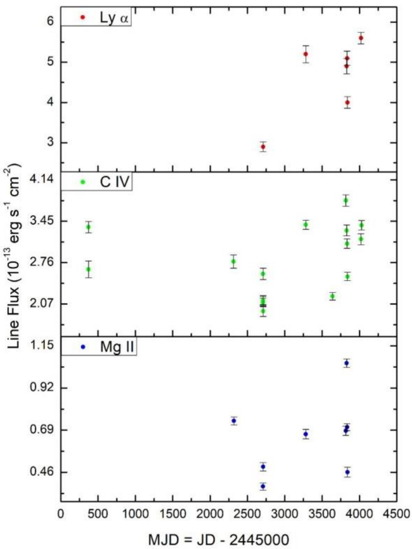

Figure 3: Light curves for the line fluxes for Ly α, Mg II, C IV in Mrk 841 for the quasi-continuous observations from 1983 to 1993. Line fluxes are in the units of 10^{-13} erg/s/cm^{2} with corresponding error bars.

3. Results and Discussions

The IUE has obtained 17 (SWP) and 10 (LWP) spectra of Mrk 841 intermittently during February 1983 – February 1993. In this paper, we report our results for the first time on long-term UV continuum variability characteristics in MRK 841 from the IUE's observations from 1988 to 1993 for the first time. The UV continuum flux over this long period has been found to vary between (2.16 ± 0.01) x 10^{-14} and (4.07 ± 0.01) x 10^{-14} erg/s/cm^{2}/Å, resulting inrelative variability amplitude(R_{max}) parameter to vary from 1.30 to 3.59. The annualised R_{max} for the years 1983, 1989, 1992 and 1993 has been found to range 1.08 to 2.27. The R_{max} for the strong emission line fluxes Ly α, N V, C IV, and Mg II has been found to vary in the range 1.92 to 2.76 in the present study. We have obtained F_{var} parameter in percentage for the strong emission lines like Ly α, N V, C IV, and Mg II as 22.79, 53.58, 24.31, 32.63, respectively. It is evident that the high ionisation potential line N V has the exhibited highest variability in its flux. The UV continuum has been found to vary by higher F_{var} percentage than the strong emission lines.

Walter, et al., (1994) have measured the UV flux in strong emission line-free continuum windows: 1350 - 1400 (1375 Å) and 2650 – 2700 (2675 Å) to be (7.1 ± 0.13) $x10^{-11}$ and (5.2 ± 0.4) $x10^{-11}$ ergs/s/cm^2 respectively. The UV continuum fluxes estimated by Walter, et al., (1994) are in close agreement with our results presented in Table 3. Nandra et al. (1995) have reported a discontinuity between the SWP and LWP continuum energy distributions in the composite IUE spectrum, but the same is not found to be true in our analysis. F_{var} is another important characterising parameter to understand the variability phenomenon in active galaxies and our results for F_{var} analysis are presented in Table 4 for the overall analysis and Table 5 for the annual analysis. The highest F_{var} value in Mrk 841 has been estimated to be ~ 60 % at 3025 Å with lowest of ~ 10 % at 2225 Å for IUE's long observational period 1988 - 1993. The R_{max} and F_{var} parameters obtained by us, along with the errors in F_{var} for both line and continuum, are tabulated in Table 4 for the overall analysis and Table 5 for the annual analysis.

Mrk 841 is one of the few active galaxies observed simultaneously by IUE, ROSAT and Ginga satellites (Walter, et al., (1994)). Measurement of UV fluxes and Soft X-ray fluxes simultaneously is important to characterise the nature of the continuum spectral components across the electromagnetic spectrum. The UV to Soft X-ray flux ratios in active galaxies are useful in characterising spectral shapes independent of the accretion disk models. Walter et al., (1994) have estimated the UV to Soft X-ray ratios for five simultaneously measured active galaxies which range from 1 to 10. Using the Soft X-ray excess fluxes of Walter et al., (1994) and the present UV continuum flux measurement at 1325 Å presented in Table 3, we get UV to Soft X-ray excess ratio to be 7.5. This ratio is in agreement with Walter's estimation. We have estimated line flux ratios in MRK 841 by taking the spectral data obtained within a day. The C IV / Ly α has been found to be ~ 0.77 for all the days of observations and is little higher compared to the value 0.63 predicted by the standard emission line formation model developed by Kwan and Krolik (1981). The C IV / Mg II ratio has varied in the range from 3.75 to 5.86. These ratios are useful in constraining/estimating the ionisation parameter in Seyfert1 galaxies according to the standard model of Kwan and Krolik (1981).

4. Summary and Conclusions

In this paper, we present the long-term UV continuum and line variability study results in Mrk 841 using the complete sample of IUE's long-term observations spread over nearly 18 years in an effort to understand the UV continuum variability phenomenon the low redshift bright Seyfert 1 active galaxies. In Mrk 841, the annualised variability analysis in 1992 has shown a moderate rise in the R_{max} and F_{var} parameters compared to the observations made in 1983, 1989 and 1993. This relatively higher R_{max} variability in the year 1992 may be due to a low amplitude UV continuum flare phenomenon or could be due to some disc instabilities and we consider this result as an important result of the present study. Furthermore, we conclude that the observation of higher variability amplitude in UV continuum than that of strong emission lines in support of the spatial separation of compact disc from the BLR region. We report the UV to Soft X-ray excess ratio to be ~7.5 from simultaneous observations of Mrk 841 by IUE, ROSAT and Ginga satellites and is consistent with the estimation of Walter, et al., (1994).

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