Peaks In Emission Lines In The Spectra Of Quasars

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Wavelength peaks compared with Wolf-Rayet stars

No.	Peak (Å)	Reported wavelengths in Wolf-Rayet (Å)
1	3356	3358.6 Underhill (1959). N III λ3355, O III λ3355.9, C III λ3358
2	3489	3493 Wright (1918). O IV λ3490.8
3	3526	not reported in WR
4	3549	not reported in WR.
5	3610	3611 Wright (1918), 3609.5 Beals (1930), 3609+ Edlén (1956), 3608.5 Underhill (1959), C III λ3609.6, He I λ3613.6.
6	3648	3645.4 Underhill (1959). C III, O IV λ3642
7	3683	3687 Edlén (1956), 3685.10 - novaelike stars (Meinel et al., 1975). C IV
8	3719	3722 Plaskett (1924), 3723 Beals (1930), 3722 Edlén (1956), 3717.1 Underhill (1959). O III λ3721
9	3770	3769 Plaskett (1924), 3769 Edlén (1956), 3770.6 Underhill (1962). O III, N III λ3773
10	3781	3784.8 Underhill (1959). He II λ3781.68, O III, N III λ3779
11	3831	3829.9 Underhill (1959). He II λ3833.80, N IV, O VI
12	3842	Not seen in WR. O IV λ3841.07,(?), C III λ3844.51 (?)
13	3855	3856.6 Underhill (1959). He II λ3858.07
14	3890	3889 Wright (1918), 3889 Plaskett (1924), 3888.9 Beals (1930), 3888, 3888.7 Swings (1942), 3887.8, 3890.9 Underhill (1959), 3889.4 Underhill (1962). He I λ3888.64, C III λλ3889.18, 3885.99
15	3903	3903.0 - novaelike stars (Meinel et al., 1975)
16	3952	3953.7 Beals (1930), 3954.4 Edlén (1956), 3954.5 Underhill (1962). O II, (C II)
17	4012	4008.2 Underhill (1959), 4008.5 Underhill (1962). N III λλ4007.88, 4013.00
18	4135	O II λ4132.8, Possible in WR stars Edlén (1956)
19	4276	4275.5 novae (Meinel et al., 1975), 4276.6 novaelike stars (Meinel et al., 1975). O II λ4275.5 Possible in WR (Edlén, 1956)
20	4524	4519.5 Plaskett (1924) 4521.3 Underhill (1959). N III λλ4523.56, 4527.9, O III λλ4524.2 4527.3, C III
21	4647	4650.8 Swings (1942). C III λλ4647.40, 4650.16, 4651.35; O II λ4649.15
22	4693	4697.0 novaelike stars (Meinel et al., 1975). O II λ4596.2 Possible in WR stars (Edlén, 1956)
23	4771	4772.1 novaelike stars (Meinel et al., 1975). O IV λ4772.6 Possible in WR stars (Edlén, 1956)
24	4801	4799 Wright (1918), 4800 Plaskett (1924), 4798.3 Edlén (1956), 4797.4 Underhill (1959), 4798.1 Underhill (1962), 4804.6 Underhill (1962). O IV λ4801
25	4817	4814.6 Underhill (1962), 4814.4 novaelike stars (Meinel et al., 1975). O IV λλ4813 4824, Si III
26	4910	4909.2 Underhill (1959). N III ?
27	4925	4923 Wright (1918), 4924 Plaskett (1924), 4924 Edlén (1956), 4927.4 Underhill (1959). He I λ4921.9
28	4956	4958 Plaskett (1924), 4959.0 novae (Meinel et al., 1975), 4959.0 old novae (Meinel et al., 1975)
29	5018	5021 Campbell (1894), 5017 Wright (1918), 5018.3 Plaskett (1924), 5018 Beals (1930), 5015.7 Swings (1942), 5018 Edlén (1956), 5019.8 Underhill (1959). He I λ5015.67, C IV λλ5015.9, 5017.7
30	5035	not seen in WR
31	5049	5049.9 Underhill (1959). He I λ5047.7, C II
32	5096	5092.9 Swings (1942)
33	5111	5111.5 novae-like stars (Meinel et al., 1975)
34	5173	5171.1 Underhill (1959). N II λ5172
35	5266	5266.3 Underhill (1959). C III,O III λ5268.1
36	5345	5343.3 Swings (1942). C II λ5336.7
37	5466	5470 Wright (1918), 5470 Beals (1930), 5470 Edlén (1956), 5469.6 Underhill (1959). C IV,O V

Introduction

We are startled to discover 37 very strong peaks in the distribution of emission lines (in the observed frame) in the spectra of quasars. We are further surprised to find 27 of these 37 lines in the spectra of Wolf-Rayet stars. An additional 5 lines are seen in novae like stars.

Method

We convert to observed frame 14277 rest frame emission lines listed in the 1993 Hewitt and Burbidge quasar catalog. We plot a histogram of the emission line frequency against the wavelength (middle plot below). We locate the strongest peaks by thesholding with a statistical significance of 4 standard deviations from what would be expected by chance (bottom plot)

Discussion

In the redshift hypothesis there is no reason why the emission lines in the observed frame should show these peaks. Thus the redshift hypothesis is unable to account for these peaks.

Theoretical and experimental investigations in physics in the 1960's and 1970's showed that when a high temperature plasma rapidly expands (for example, in vacuum) the resulting cooling leads to a population inversion in the lower levels of the atom, and this can lead to laser action

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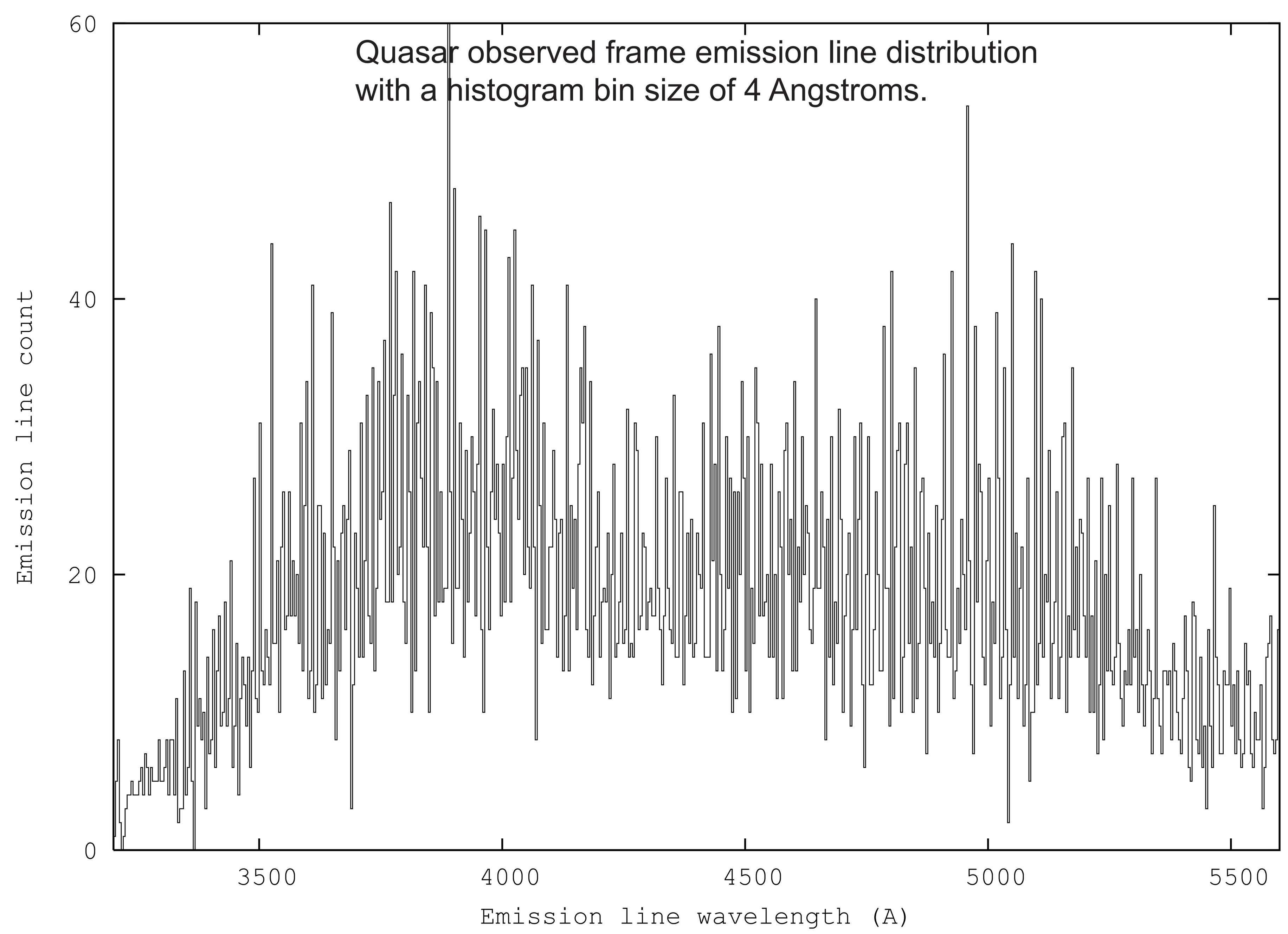

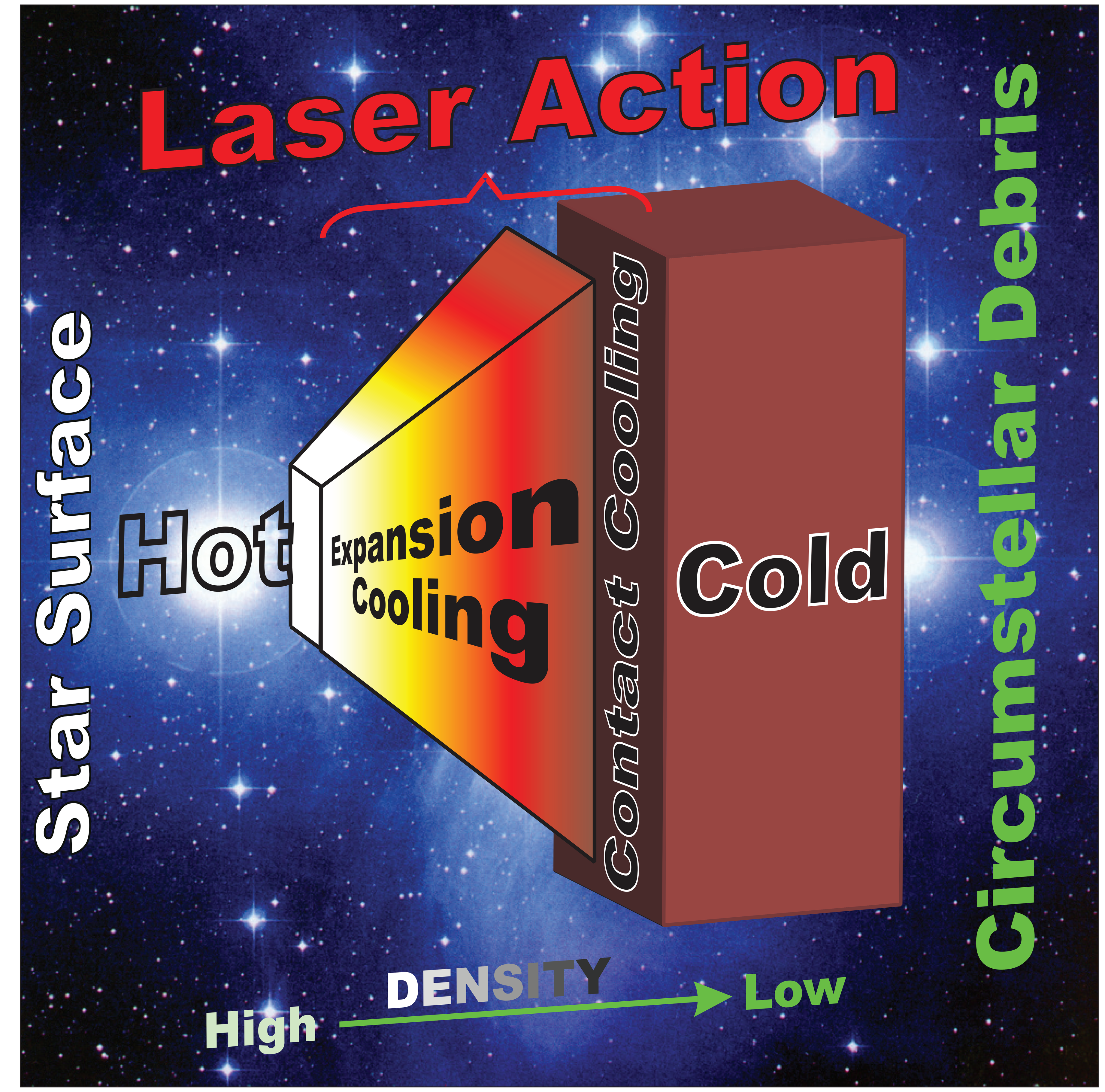

Conclusion: Plasma-Laser Star Model

This led Varshni (1975, ApSS 37, L1; 1977, ApSS 46, 443; 1979 Phys. Canada 35, 11) to propose that a quasar is a star in which the surface plasma is undergoing rapid radial expansion giving rise to population inversion and laser action in some of the atomic species. The assumption of high speed matter ejections from quasars is supported from the fact that the widths of emission spectral lines observed in quasars are typically of the order of 2000-4000 km/sec. Ejected matter either forms a nebulosity around the quasar or dissipates into space. Laser action is enhanced if hot plasma contacts this colder gas. No redshifts are needed. It is known that some atomic transitions are more susceptible to laser action than others. The peaks correspond to such transitions and such lines occur more frequently in quasar spectra.