

A CHECKLIST OF SUPERNOVAE IN THE NGC AND IC GALAXIES THROUGH 1985

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Abstract

This Checklist of Supernovae in the NGC and IC Galaxies Through 1985 is presented to assist those interested in undertaking a visual or photographic search for extragalactic supernovae. Some galaxies appear to have had more than one or two supernovae, and these should be monitored closely for any new outbursts.

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1. Introduction

Various sources were used in this compilation, which is as complete as possible. This list is not intended to replace any general authoritative listing and is a guide only. Any errors or omissions, therefore, should be reported to the author, as it is hoped that a new list will be compiled from time to time.

For supernovae prior to 1976 the **General Catalogue of Variable Stars** (Kukarkin *et al.* 1969) (GCVS) and **Supplements** (Kukarkin *et al.* 1971; 1974; 1976) were consulted. After 1975 (December) the **IAU Circulars** as edited by Marsden were used.

2. Description of Format

1. **NGC** = The standard number from the **New General Catalogue of Nebulae and Clusters of Stars** (Dreyer 1888).

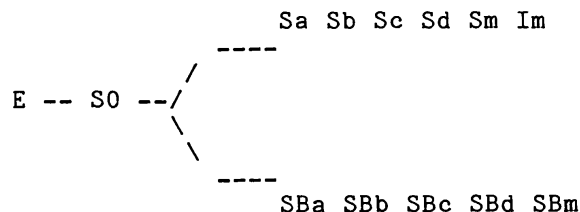
2. **IC** = The number in the **Index Catalogue** (Dreyer 1895) and the **Second Index Catalogue** (Dreyer 1908), with additional references by Sulentic and Tifft (1977).

3. **OTHER?** = Other designations as in the following example:
M31 - The number in the catalogue of Charles Messier (Becvar 1960).

4. **GALAXY TYPE** = Galaxy types were obtained primarily from **A Revised Shapley-Ames Catalog of Bright Galaxies** (Sandage and Tammann 1981).

For an extensive review of the classification of galaxies, other references should be consulted, as certain precepts are set down by various authorities and are beyond the scope of this listing.

However, the following classification may be represented:



with intermediate classes (S0/a, etc.) (after Sandage 1961). The new class "Amorphous" which replaces "Irr" (Sandage and Brucato 1979) has

not been retained, as it is felt to be too ambiguous for this paper. Some galaxies, mainly spirals, are represented by a simple S as a definite designation has not been given in the available texts consulted.

Descriptive terms, such as "Pec" (= peculiar), have been added where necessary.

Barred spirals are designated SB, intermediate type S/SB with the normal spiral having arms that curve out directly from the rounded condensed center. In a barred spiral these arms begins at opposite ends of a flattened oblong central bar.

To the primary letter S or SB is appended one of four small letters, a, b, c, or d. These serve to further differentiate among the various sub-classes. In an "a" system the central bulge appears to dominate the general structure of the galaxy, giving rise to tightly-wound narrow arms. In a "b" system the central bulge and spiral arms appear equally prominent. In a "c" system the spiral arms are widely opened and well-resolved into clumps and clouds of stars. The fourth sub-class, "d," is used to designate a tiny central condensation of the center, giving an almost stellar appearance. In this sub-class, the spiral nature is hard to distinguish from the star clouds throughout the system.

The existence of an inner ring structure is further indicated by "(r)." Again there is a further sub-class denoted by "(s)" to indicate spirals whose arms spring from the ends of the bar or can be traced to the center. Intermediate types are again present and are denoted by "(rs)." To further complicate matters, any outer rings are indicated by an R preceding the type (see NGC 6217).

The E and S0 galaxies are classified according to their flattening (Sandage 1961). The further subdivision of S0 galaxies into S01, S02, etc., according to their dust content is by Sandage (1961). The subdivision of barred spirals into SB01, SB02, etc., should not, however, be confused with the classes just described, as the 01, 02, etc., refer to the character of the bar and not to the presence of dust (Sandage 1961).

The I or IRR systems are irregular galaxies which appear as coarse masses of star clouds without any definite structure. Some of these, however, may grade into coarse spirals as some appear to show a weak spiral pattern.

Additional information on classifying galaxies may be obtained from de Vaucouleurs (1964; 1977) or Zwicky *et al.* (1961-68).

As this list indicates, supernovae are prominent in the S-type galaxies, especially the Sc and Sb types.

5. **YEAR[S]** = The year the supernova was found. In most cases the same year the outburst actually occurred (but not always).

6. **SUPER MAG** = The supernova magnitude, taken from various published authorities and noted as "v" (visual), "p" (photovisual), "pg" (photographic), and "B" (B on the **UBV** system).

7. **GAL MAG** = The magnitude estimate for the galaxy, obtained from **Burnham's Celestial Handbook**, Volumes 1, 2, and 3 (Burnham 1978), with occasional reference to **Atlas Coeli II - Katalog 1950.0** (Becvar 1960). Unless otherwise stated the magnitude estimates are visual.

8. **IAUC[S]** = The **IAU Circulars**, referenced from December, 1975, to January, 1986.

3. Additional Comments

The actual listing was compiled using a COMPAQ computer running MS-DOS version 2.11. The software is a PC-FILE III version 1.0. If so desired, the author will supply the data on a properly formatted diskette accompanied by a large self-addressed mailer (stamped if requested from Canada; postage funds included otherwise). Please note, however, that the actual program is not available. It may be obtained from the software developer.

4. Conclusion

The AAVSO has had a regular supernovae search program and is currently developing field charts for specific galaxies. This listing should encourage observers to undertake a systematic check of likely candidates for supernovae.

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TABLE I

Extra-Galactic Supernovae

NGC	IC	OTHER?	GALAXY TYPE	YEAR(S)	SUPER MAG	GAL MAG	IAUC(S)
				1984	14.0pg		3981
				1969?	?		
			S	1956	19.2p		
			Sa	1940	16.3p		
			I	1967	19.0p		
			S0	1963	13.7B		
				1976	14.5p		2959
			Sb	1963	16.5p		
				1983	14.0pg		3875
				1976	15.0p		2999
				1985	17.4p		4141
			Sc	1963	18.5p		
			Sc	1970	11.0B		
			E1	1950	14.5p		
			Sc	1937	8.2p		
			SBb	1962	13.0p		
				1935	15.0p		
			S	1934	13.4p		
				1971	13.0p		
				1984	19.0pg		4002
				1978	12.9v		3309
			E0q	1961	16.8p		
23		MARK 545	Sb	1955	16.0v	12.9	
210			SBb(rs)	1954	15.9P	12.0	
224		M31	Sb	1664?; 1898; 1885	6.0v; 10.0v; 5.4v	3.5	
251			Sb	1916	14.5p		
253			Sc(s)	1940	14.0p	7.0	
321			S	1939	15.0p		
488			Sab(rs)	1976	15.0p	11.2	2998
493			Sc	1971	15.5p		
521			SBc(rs)	1966; 1982	14.0p; 15.0p	13.0	3724
536			S	1963	17.7p		
550			S	1961	17.2p		
735			S	1972	15.0p		
753			Sc(rs)	1954	18.5p	12.9	
968			E	1856?	9.5v		
977			Sb	1976	15.5p		3021
991			Sc(rs)	1984	13.5pg	12.7	3979
1003			Sc	1937	12.8p		
1058			Sc	1961; 1969	11.5p; 12.8p	12.5	
1073			SBc(rs)	1962	13.6B	12.0	
1084			Sc(s)	1963	13.7B	11.1	
1090			SBc(s)	1962; 1971	17.5p; 16.0v	12.8	
1187			SBbc(s)	1982	14.4v	11.3	3739
1199			E2	1979	17.0p	12.7	3444
1255			Sc(s)	1980	17.0p	12.1	3559
1275		PER A	Epec	1968	15.5p	13.0	
1310			E	1965	18.0p		
1313			SBc(s)	1962	10.0p	10.8	
1316		FOR A	SaPec	1980; 1981	12.6v; 12.7v	10.1	3548; 3583
1325			Sb	1975	14.6	12.5	2893
1332			S01	1982	14.0v	11.2	3684
1350			Sa(r)	1959	16.0p	11.8	
1365			SBb(s)	1957; 1983	16.5p; 13.5v	10.5	3895
1411			S02	1977	17.0p	12.0	3091
1433			SBb(s)	1985	13.5v	11.4p	4119
1482			E	1937	12.2p		
1511			ScPec	1935?	12.5p	12.1	
1532			Sab	1981	13.5v	11.8	3578
1533			SB02/SBa	1970	11.8v	12.3	

TABLE I (cont'd)
Extra-Galactic Supernovae

NGC	IC	OTHER?	GALAXY TYPE	YEAR[S]	SUPER MAG	GAL MAG	IAUC[S]
1559			Sbc(s)	1984	15.0pg		3963
1654			E	1962	14.2p		
1971	CL LMC		OPENCL	1971	?		
2207			Sc(s)	1975	14.4v	12.3	
2268			Sbc(s)	1982	14.0p	12.2	3667
2276			Sc(r)	1962; 1968; 1968	16.9p; 15.6p; 16.2p	12.4	
2403			Sc(s)	1954; 1971	16.0p; 16.0p?	8.8	
2487			Sbc	1975	14.5p		
2535			Sc	1901	14.7p		
2565			S	1960	15.5p		
2599			S	1965	15.7p		
2608			Sbc(s)	1920	10.5p	12.8	
2672/3			E2	1938	15.5p	12.6	
2713			Sbc(s)	1968	12.7p	12.7	
2748			SC	1985	14.5p	12.4	4031
2841			Sb	1912; 1957; 1972	16.3p; 13.6p; 15.9v	9.4	
2935			Sbb(s)	1975	15.0v	12.4	
2941			E; (E)	1855? (or in 2943)	9.5v		
2968			S03Pec	1970	15.5p	12.8	
3003			Sc	1961	12.8p	12.1	
3044			Scd	1983	14.0pg	12.6	3787
3051			E	1970	15.0v		
3074			Sc	1965	14.7p		
3106			E	1983	16.0pg		3815
3115			S01	1935	?	9.3	
3147			Sb	1972	14.9p	11.3	
3169			Sb(r)	1984	15.0v	11.4	3931
3177			Sb(s)	1947	14.5p	12.8	
3184			Sc(r)	1921; 1921; 1937	10.7p; 11.0p; 13.2p	9.8	
3198			Sc(rs)	1966	11.1B	11.0	
3200			Sb	1953	19.1p	12.8	
3221			S	1961	17.5p		
3226			S01	1976 (or in 3227)	17.0B	12.7	3029
3227			Sb(s)	1976?; 1983	17.0B?; 12.0v	11.6	3029; 3887
3254			Sb(s)	1941	14.2p	12.5	
3266			E	1950	14.5p		
3294			Sc(s)	1955?	14.0p	11.6	
3310			SbcPec	1974	16.5p	10.1	
3336			S	1984	15.0p		4024
3338			Sbc(s)	1915	14.4p	11.6	
3348			E0	1974?	11.0p?		
3359			Sbc(s)	1985	12.0v	11.0	4050
3389			Sc(s)	1967	12.7B	12.2	
3556	M108		Sc(s)	1969	13.5p	10.1	
3570			S0	1973	17.0v		
3574			E	1973	18.0v		
3583			Sb(s)	1975	15.0p	12.2	
3625			E	1983	15.2p		3900
3627	M66		Sb(s)	1973	14.5v	9.0	
3631			Sc(s)	1964; 1965	17.0p; 16.0p	10.5	
3656			I	1963; 1973	15.0p; 17.0v		
3675			Sb(r)	1984	13.0v	10.6	4021
3733			S	1980	15.5v		3462
3756			Sc(s)	1975	17.5v	12.3	3756
3780			Sc(r)	1978	16.5p	12.6	3303
3811			Sc	1969; 1971	16.0p; 16.1p		
3834			E	1968	16.2p		
3904			E3	1971?	15.3v	11.9	
3913			E	1963; 1979	13.4p; 14.8p		3340
3916			Sb	1974	15.5p		

TABLE I (cont'd)

Extra-Galactic Supernovae						
NGC	IC	OTHER?	GALAXY TYPE	YEAR[S]	SUPER MAG	GAL MAG IAUC[S]
3938			Sc(s)	1961; 1964	13.5p; 13.1p	11.2
3947			SBc	1972	16.0v	
3977			E	1946	18.0p	
3992	M109		SBb(rs)	1956	12.0p	9.9
4027			Sc(s)	1954?	?	11.6
4038/9			ScPec	1921; 1974	? ; 15.5p	11.0
4045			Sbc(s)	1985	13.0p	12.8 4035
4051			SBc(s)	1983	13.5pg	11.2 3813
4096			Sc(s)	1960	14.5p	11.5
4102			Sb(r)	1975	16.7v	12.2
4129			Sb	1954	19.9p	12.9
4136			Sc(r)	1941	16.8p	12.1
4146			S	1963	15.5p	
4156			SBb	1974	20.0p	
4157			Sbc	1937; 1955; 1964	14.5p; 16.8p; ?	12.0
4162			Sc(s)	1965	14.0p	12.6
4165			Sc	1971	13.0v	
4178	IC 3042		SBc(s)	1963	12.9p	12.0
4183			Scd	1968	14.5p	
4185			S	1982	17.v	3683
4189	IC 3050		SBc(sr)	1966	14.6p	12.7
4214			SBm	1954	9.5p	9.9
4220			Sa(r)	1983	14.5pv	12.3 3835
4246			Sb	1984	18.0pg	3921
4254	M99		Sc(s)	1967; 1972	14.0p; 15.8B	10.1
4258	M106		Sb(s)	1981?	17.0p?	8.6 3803
4273			SBc(s)	1936	14.1p	12.3
4298			Sc(s)	1975	15.0p	11.9
4303	M61		Sb(s)	1926; 1961; 1964	12.6p; 10.8p; 13.0B	9.6
4321	M100		Sc(s)	1901; 1914; 1959; 1979	12.1p; 14.0p; 17.5p; 11.0v	10.6 3348
4335			E	1955	16.3p	
4340			SB02(r)	1977	16.2pg	13.0 3035
4374	M84		E1	1957; (1980 or in 4406)	12.2p; (14.0v)	9.3 3492
4375			E	1960	18.5p	
4382	M85		S01Pec	1960	11.5p	9.3
4402			Sb	1976	14.5p	13.0
4406	M86		S01/E3	1980? or in 4374	14.0v	9.2 3492
4410A			E?	1965	16.0p	
4414			Sc(sr)	1974	12.2v	9.7
4419			SBab	1984	12.5v	11.4 3907
4424			SaPec	1895	11.1p	12.5
4451			E	1985	14.5p	4049
4453			I	1966	16.5p	
4472	M49		E1/S01	1969	13.0p	8.6
4486	M87		E0	1919; 1922?	11.5p; ?	9.2
4490			ScdPec	1982	16.0v	9.8 3689
4496A			SBc	1960	11.3p	12.0
4526			S03	1969	16.0p	10.7
4527			Sb(s)	1915	13.0p	11.3
4536			Sc(s)	1981	12.0v	11.0 3580
4545			S	1940	12.8p	
4559			Sc(s)	1941	12.8p	10.5
4564			E6	1961	11.9p	12.1
4618			SBbc(rs)	1985	16.0pg	11.2 4049
4621	M59		E5	1939	12.7p	9.3
4632			Sc(s)	1946	15.7p	12.1
4636			E0/S01	1939	12.4p	10.8
4647			Sc(rs)	1979	15.0p	12.0 3322
4666			SBc	1965	14.0p	11.4
4674			S	1907	13.5p	

TABLE I (cont'd)

Extra-Galactic Supernovae						
NGC	IC	OTHER?	GALAXY TYPE	YEAR[S]	SUPER MAG	GAL MAG IAUC[S]
4688			Sbc(s)	1966	15.0B	13.0
4699			Sab(sr)	1948; 1983	17.5p; 14.0pg	10.3 3827
4716			E	1981	15.0p	3614
4725			Sb/SBb(r)	1940; 1969	12.6p; 15.0p	9.5
4727			E	1965	16.0p	
4753			S0	1965; 1983	12.3p; 12.9v	10.6 3789
4782/3	3C 278		E0	1956	12.2p	
4798			E	1971	13.0p	
4874			E/S0	1968; 1981	17.4p; 15.0p	13.5
4887			E	1964	16.3p	
4902			SBb(s)	1979	16.0p	11.6 3395
4921			Sb	1959	18.5p	
4939			Sbc(rs)	1968; 1973	16.0p; 16.0v	12.2
4944			S0	1973	17.0v	
4975			S0	1968; 1968	15.0p; 15.0p	
4981			SBbc(sr)	1968	13.5p	12.2
5033			Sbc(s)	1950; 1957?; 1985	18.2p; 15.0p; 12.5p	10.2 4077
5055	M63		Sbc(s)	1971	11.5v	10.1
5082			E	1958	16.0p	
5090			E2	1981	14.5p	12.9 3581
5161			Sc(s)	1974	14.5v	12.5
5194/5	M51		Sbc/SB01Pec	1945	11.0p in 5195	8.4/11
5230			Sc(s)	1970; 1970	17.2p; 17.2p	12.9
5236	M83		Sbc(s)	1923; 1950; 1957; 1968; 1983	15.0p; 16.0p; 7.5p 7.8p; 12.5v	10.1 3835
5253	HARD 10		I	1895; 1972	7.5p; 7.8p	10.8
5364			Sc	1979	15.0p	11.5
5406			Sc(s)	1977	14.0p	13.0 3053
5427			Sbc(s)	1976	14.5v	12.0 2984
5457	M101		Sc(s)	1909; 1951; 1970	12.1p; 17.0p; 11.0p	9.6
5485			S03Pec	1982	15.0p	12.6 3756
5597			Sbc(s)	1981	17.0p	12.6 3609
5668			Sc(s)	1952; 1954	17.9p; 12.0p	12.3
5679AB			S	1982	18.0v	3681
5746			Sb(s)	1983	13.0v	11.7 3841
5854			Sa	1980	15.0p	12.6 3462
5857			SBb	1950; 1955	18.1p; 14.5p	
5861			Sc(s)	1971	15.5v	12.4
5879			Sb(s)	1954	14.5p	12.2
5905			SBb(rs)	1963	15.0B	13.1
5907			Sc	1940	14.0p	10.4
6181			Sc(s)	1926; 1951	14.2p; 15.7p	
6217			RSBbc(s)	1983	15.1pg	12.0 3813
6384			Sb(r)	1971	13.0v	12.3
6835			E8?	1962	12.9p	13.0
6907			SBbc(s)	1984	15.0pg	12.1 3951
6946			Sc(s)	1917; 1939; 1948; 1968; 1969?; 1980	14.5p; 11.8p; 14.0p; 11.0v?; 15.4p; 11.0v	11.1 3532
7038			Sbc(s)	1983	18.0pg	12.5 3828
7083			Sb(s)	1983	18.0pg	11.8 3792
7177			Sab(r)	1960; 1976	16.0p; 16.5v	12.0 2991
7184			Sb(r)	1984	14.0pg	12.0 3962
7292			I	1964	13.5p	
7319			SBb	1971	16.0p	
7331			Sb(rs)	1959	12.7p	9.6
7337			Sbc	1973	19.0v	
7343			Sb	1974	15.5p	
7418			Sc(rs)	1983	15.5p	11.8 3867
7448			Sc(r)	1980	13.5p	11.8 3547
7465			E	1950?	13.0p	
7495			Sc	1973	15.5p	
7564			S	1972	18.0p	

TABLE I (cont'd)

Extra-Galactic Supernovae

NGC	IC	OTHER?	GALAXY TYPE	YEAR(S)	SUPER MAG	GAL MAG	IAUC(S)
7606			Sb(r)	1965	16.0p	11.9	
7609			EPec	1973	19.0v		
7619			E3	1970	14.5p	12.6	
7634			S0	1972	14.3B		
7713			Sc(s)	1982	16.0p	11.8	3717
7723			S8b(rs)	1975	13.9v	12.1	
7768			E	1968	17.9p		