

Planetary Nebulae

A planetary nebula is a kind of emission nebula consisting of an expanding, glowing shell of ionized gas ejected from old red giant stars late in their lives. The term "planetary nebula" is a misnomer that originated in the 1780s with astronomer William Herschel because when viewed through his telescope, these objects appeared to him to resemble the rounded shapes of planets. Herschel's name for these objects was popularly adopted and has not been changed. They are a relatively short-lived phenomenon, lasting a few tens of thousands of years, compared to a typical stellar lifetime of several billion years.



The mechanism for formation of most planetary nebulae is thought to be the following: at the end of the star's life, during the red giant phase, the outer layers of the star are expelled by strong stellar winds. Eventually, after most of the red giant's atmosphere is dissipated, the exposed hot, luminous core emits ultraviolet radiation to ionize the ejected outer layers of the star. Absorbed ultraviolet light energizes the shell of nebulous gas around the central star, appearing as a bright colored planetary nebula at several discrete visible wavelengths.

Planetary nebulae may play a crucial role in the chemical evolution of the Milky Way, returning material to the interstellar medium from stars where elements, the products of nucleosynthesis (such as carbon, nitrogen, oxygen and neon), have been created. Planetary nebulae are also observed in more distant galaxies, yielding useful information about their chemical abundances.

In recent years, Hubble Space Telescope images have revealed many planetary nebulae to have extremely complex and varied morphologies. About one-fifth are roughly spherical, but the majority are not spherically symmetric. The mechanisms which produce such a wide variety of shapes

and features are not yet well understood, but binary central stars, stellar winds and magnetic fields may play a role.

This list was developed for the Astronomical League by the Back Bay Amateur Astronomers of southeastern Virginia. The list contains only objects that rise above the horizon from there. The most southerly object on the list is at a declination of -40 degrees 26 minutes. So this list does not include significant but very southern planetary nebula.

Finally when starting a program to observe or photograph planetary nebula, many of these objects are mere arcseconds in size and will appear 'star-like' and not resolveable. Planetary nebula can be very challenging.

Catalog Abbreviations

Abell	Abell Catalog of Planetary Nebulae
BD	Bonner Durchmusterung
Hu	Humason
IC	Index Catalog
J	Jonckheere
JnEr	Jones-Emberson
Jones	Jones
M	Messier
Min	Minkowski
NGC	New General Catalog
Pease	Pease
Sh	Sharpless
Vy	Vysotsky

Planetary Nebulae

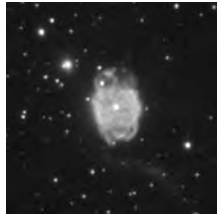
Object	Con	RA	Dec
NGC 40	Cep	00h 13m 01s	+72° 31' 18"
NGC 246	Cet	00h 47m 03s	-11° 52' 18"
M76	Per	01h 42m 20s	+51° 34' 30"
IC 1747	Cas	01h 57m 36s	+63° 19' 18"
Abell 4	Per	02h 45m 26s	+42° 32' 36"
IC 289	Cas	03h 10m 19s	+61° 19' 00"
NGC 1360	For	03h 33m 15s	-25° 52' 18"
IC 351	Per	03h 47m 33s	+35° 02' 48"
IC 2003	Per	03h 56m 22s	+33° 52' 30"
NGC 1501	Cam	04h 06m 59s	+60° 55' 12"
NGC 1514	Tau	04h 09m 17s	+30° 46' 36"
NGC 1535	Eri	04h 14m 16s	-12° 44' 24"
Sh 2-216	Per	04h 45m 35s	+46° 48' 30"
J 320	Ori	05h 05m 34s	+10° 42' 00"
IC 418	Lep	05h 27m 28s	-12° 41' 48"
NGC 2022	Ori	05h 42m 06s	+09° 05' 12"
IC 2149	Aur	05h 56m 24s	+46° 06' 18"
IC 2165	Cma	06h 21m 43s	-12° 59' 12"
J 900	Gem	06h 25m 57s	+17° 47' 27"
Min 1-7	Gem	06h 37m 21s	+24° 00' 24"
NGC 2346	Mon	07h 09m 23s	-00° 48' 24"
NGC 2371-2	Gem	07h 25m 35s	+29° 29' 24"
Abell 21	Gem	07h 29m 03s	+13° 15' 12"
NGC 2392	Gem	07h 29m 11s	+20° 54' 42"
NGC 2438	Pup	07h 41m 51s	-14° 44' 06"
NGC 2440	Pup	07h 41m 55s	-18° 12' 30"
NGC 2452	Pup	07h 47m 26s	-27° 20' 06"
JnEr 1	Lyn	07h 57m 56s	+53° 25' 00"
NGC 2610	Hya	08h 33m 23s	-16° 09' 00"
Min 3-6	Pyx	08h 40m 39s	-32° 22' 06"
NGC 2818	Pyx	09h 16m 02s	-36° 37' 36"
NGC 3132	Vel	10h 07m 00s	-40° 26' 00"
NGC 3242	Hya	10h 24m 46s	-18° 38' 30"
M97	UMa	11h 14m 48s	+55° 01' 06"
NGC 4361	Crv	12h 24m 31s	-18° 47' 06"
IC 3568	Cam	12h 33m 07s	+82° 33' 48"

Object	Con	RA	Dec
Abell 35	Hya	12h 53m 34s	-22° 52' 18"
Abell 36	Vir	13h 40m 41s	-19° 52' 54"
NGC 5873	Lup	15h 12m 51s	-38° 07' 30"
NGC 6026	Lup	16h 01m 21s	-34° 32' 36"
NGC 6058	Her	16h 04m 27s	+40° 41' 00"
IC 4593	Her	16h 11m 45s	+12° 04' 18"
NGC 6072	Sco	16h 12m 58s	-36° 13' 48"
NGC 6153	Sco	16h 31m 30s	-40° 15' 00"
NGC 6210	Her	16h 44m 30s	+23° 48' 00"
IC 4634	Oph	17h 01m 34s	-21° 49' 36"
Min 2-9	Oph	17h 05m 38s	-10° 08' 24"
NGC 6302	Sco	17h 13m 44s	-37° 06' 12"
NGC 6309	Oph	17h 14m 04s	-12° 54' 36"
NGC 6337	Sco	17h 22m 16s	-38° 29' 00"
NGC 6369	Oph	17h 29m 21s	-23° 45' 36"
NGC 6445	Sgr	17h 49m 15s	-20° 00' 36"
IC 4670	Sgr	17h 55m 07s	-21° 44' 42"
NGC 6543	Dra	17h 58m 33s	+66° 38' 00"
NGC 6537	Sgr	18h 05m 13s	-19° 50' 36"
NGC 6565	Sgr	18h 11m 53s	-28° 10' 54"
NGC 6563	Sgr	18h 12m 03s	-33° 52' 06"
NGC 6572	Oph	18h 12m 06s	+06° 51' 12"
NGC 6567	Sgr	18h 13m 45s	-19° 04' 36"
NGC 6578	Sgr	18h 16m 17s	-20° 27' 00"
NGC 6620	Sgr	18h 22m 54s	-26° 49' 18"
NGC 6629	Sgr	18h 25m 43s	-23° 12' 12"
NGC 6644	Sgr	18h 32m 35s	-25° 07' 42"
IC 4732	Sgr	18h 33m 55s	-22° 38' 42"
IC 4776	Pav	18h 45m 51s	-33° 20' 36"
M57	Lyr	18h 53m 35s	+33° 01' 42"
IC 1295	Set	18h 54m 37s	-08° 49' 36"
NGC 6742	Dra	18h 59m 18s	+48° 28' 00"
Sh 2-71	Aql	19h 02m 01s	+02° 09' 24"
NGC 6741	Aql	19h 02m 37s	-00° 27' 00"
NGC 6751	Aql	19h 05m 56s	-05° 59' 30"
NGC 6765	Lyr	19h 11m 06s	+30° 33' 00"
IC 4846	Aql	19h 16m 28s	-09° 02' 36"
IC 1297	CrA	19h 17m 23s	-39° 36' 48"
NGC 6778	Aql	19h 18m 25s	-01° 35' 48"

Object	Con	RA	Dec
NGC 6781	Aql	19h 18m 28s	+06° 32' 12"
NGC 6790	Aql	19h 22m 57s	+01° 30' 48"
Vy 2-2	Aql	19h 24m 23s	+09° 53' 54"
NGC 6803	Aql	19h 31m 16s	+10° 03' 24"
NGC 6804	Aql	19h 31m 35s	+09° 13' 30"
NGC 6807	Aql	19h 34m 34s	+05° 41' 00"
BD +30 3639	Cyg	19h 34m 45s	+30° 31' 00"
NGC 6818	Sgr	19h 43m 58s	-14° 09' 12"
NGC 6826	Cyg	19h 44m 48s	+50° 31' 30"
NGC 6833	Cyg	19h 49m 47s	+48° 57' 42"
M27	Vul	19h 59m 36s	+22° 43' 18"
NGC 6884	Cyg	20h 10m 24s	+46° 27' 42"
NGC 6879	Sge	20h 10m 27s	+16° 55' 24"
NGC 6881	Cyg	20h 10m 56s	+37° 25' 00"
NGC 6886	Sge	20h 12m 43s	+19° 59' 24"
NGC 6891	Del	20h 15m 09s	+12° 42' 18"
NGC 6894	Cyg	20h 16m 24s	+30° 33' 54"
IC 4997	Sge	20h 20m 09s	+16° 43' 54"
NGC 6905	Del	20h 22m 23s	+20° 06' 18"
NGC 7008	Cyg	21h 00m 33s	+54° 32' 36"
NGC 7009	Aqr	21h 04m 11s	-11° 21' 48"
NGC 7026	Cyg	21h 06m 19s	+47° 51' 06"
NGC 7027	Cyg	21h 07m 01s	+42° 14' 12"
Sh 1-89	Cyg	21h 14m 09s	+47° 46' 24"
NGC 7048	Cyg	21h 14m 15s	+46° 17' 18"
Pease 1	Peg	21h 30m 00s	+12° 10' 00"
IC 5117	Cyg	21h 32m 31s	+44° 35' 48"
Hu 1-2	Cyg	21h 33m 07s	+39° 38' 18"
NGC 7094	Peg	21h 36m 53s	+12° 47' 18"
IC 5217	Lac	22h 23m 56s	+50° 58' 00"
NGC 7293	Aqr	22h 29m 39s	-20° 50' 12"
NGC 7354	Cep	22h 40m 20s	+61° 17' 06"
NGC 7662	And	23h 25m 54s	+42° 32' 06"
Jones 1	Peg	23h 35m 56s	+30° 28' 00"
Abell 82	Cas	23h 45m 48s	+57° 04' 00"

Planetary Nebula Observing Log

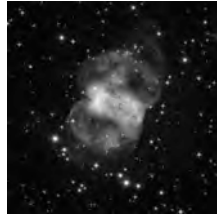
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NGC 246		NGC 5873		NGC 6781	
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Abell 4		IC 4593		NGC 6803	
IC 289		NGC 6072		NGC 6804	
NGC 1360		NGC 6153		NGC 6807	
IC 351		NGC 6210		BD +30 3639	
IC 2003		IC 4634		NGC 6818	
NGC 1501		Min 2-9		NGC 6826	
NGC 1514		NGC 6302		NGC 6833	
NGC 1535		NGC 6309		M 27	
Sh 2-216		NGC 6337		NGC 6884	
J 320		NGC 6369		NGC 6879	
IC 418		NGC 6445		NGC 6881	
NGC 2022		IC 4670		NGC 6886	
IC 2149		NGC 6543		NGC 6891	
IC 2165		NGC 6537		NGC 6894	
J 900		NGC 6565		IC 4997	
Min 1-7		NGC 6563		NGC 6905	
NGC 2346		NGC 6572		NGC 7008	
NGC 2371-2		NGC 6567		NGC 7009	
Abell 21		NGC 6578		NGC 7026	
NGC 2392		NGC 6620		NGC 7027	
NGC 2438		NGC 6629		Sh 1-89	
NGC 2440		NGC 6644		NGC 7048	
NGC 2452		IC 4732		Pease 1	
JnEr 1		IC 4776		IC 5117	
NGC 2610		M 57		Hu 1-2	
Min 3-6		IC 1295		NGC 7094	
NGC 2818		NGC 6742		IC 5217	
NGC 3132		Sh 2-71		NGC 7293	
NGC 3242		NGC 6741		NGC 7354	
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IC 3568		IC 4846		Abell 82	
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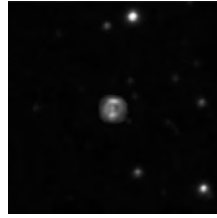
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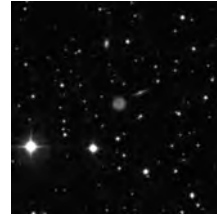
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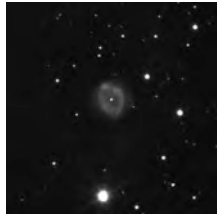
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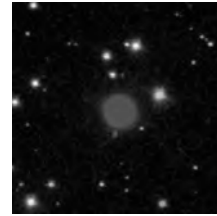
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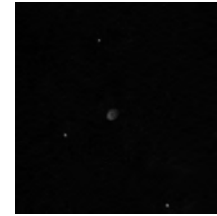
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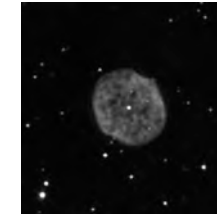
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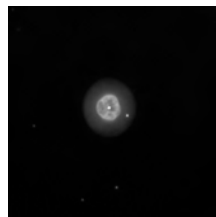
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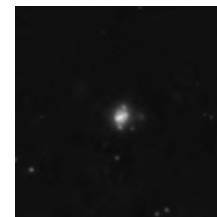
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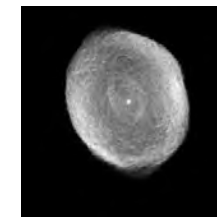
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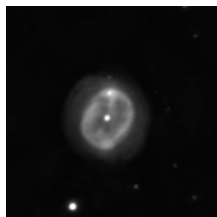
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J 320



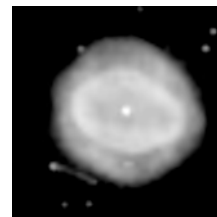
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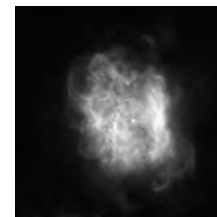
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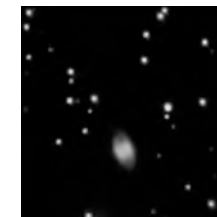
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IC 2165



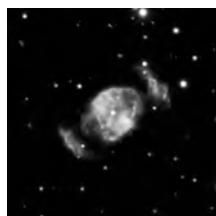
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Min 1-7



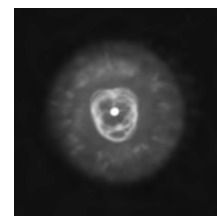
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NGC 2371-2



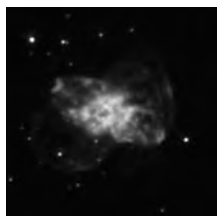
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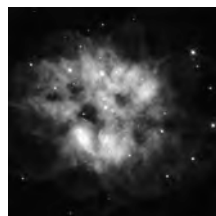
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NGC 2438



NGC 2440



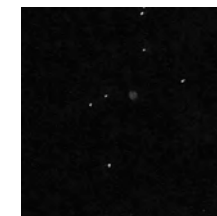
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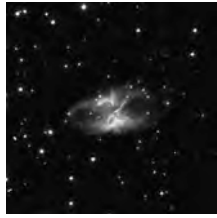
JnEr 1



NGC 2610



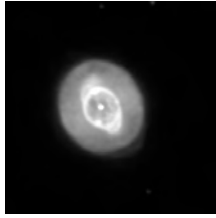
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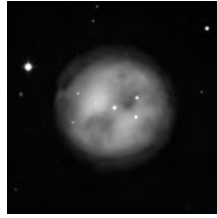
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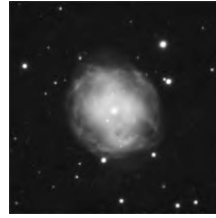
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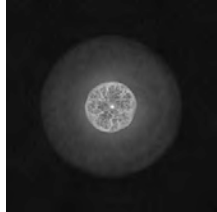
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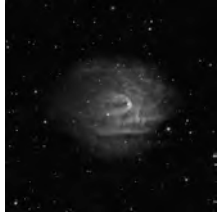
M97



NGC 4361



IC 3568



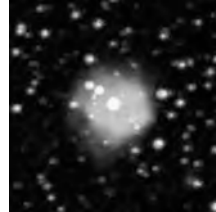
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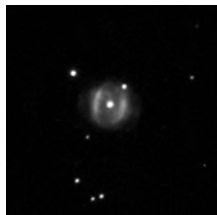
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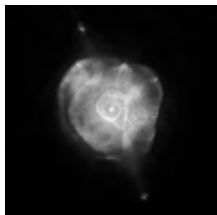
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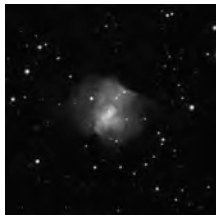
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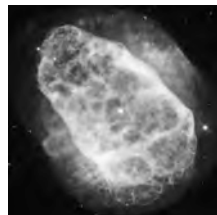
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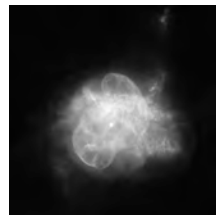
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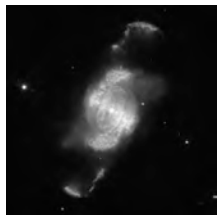
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NGC 6153



NGC 6210



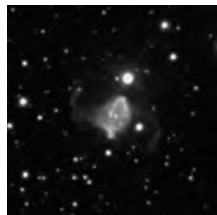
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Min 2-9



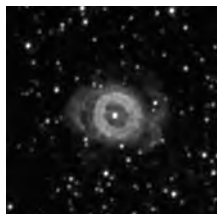
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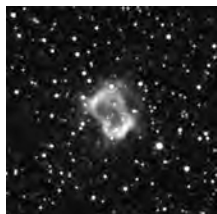
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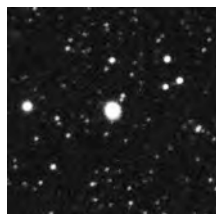
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NGC 6369



NGC 6445



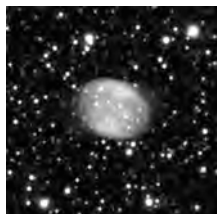
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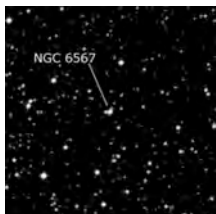
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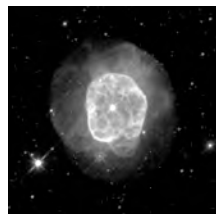
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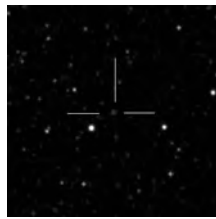
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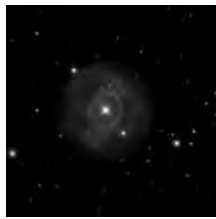
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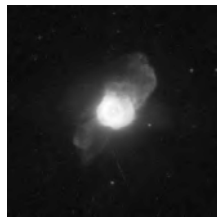
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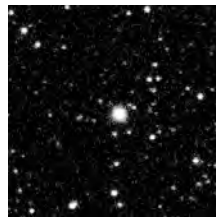
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NGC 6629



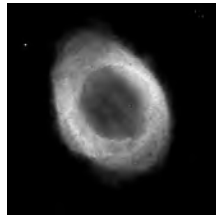
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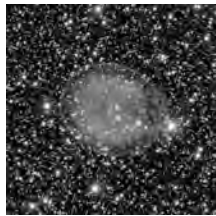
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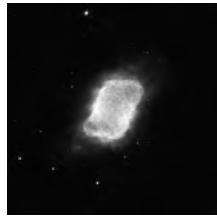
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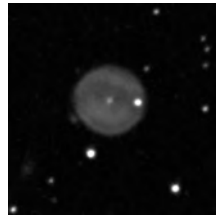
M57



IC 1295



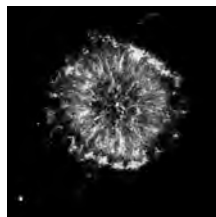
NGC 6741



NGC 6742



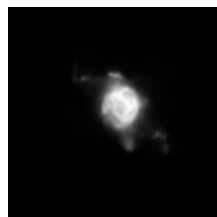
Sh 2-71



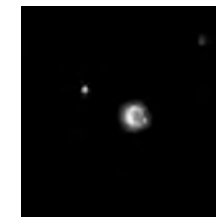
NGC 6751



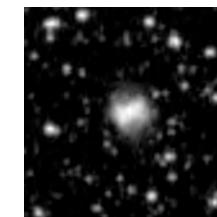
NGC 6765



IC 4846



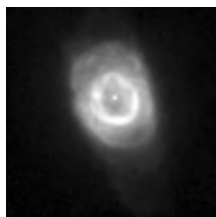
IC 1297



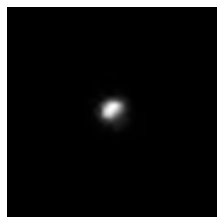
NGC 6778



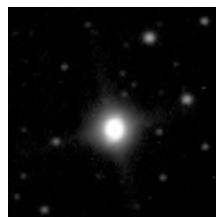
NGC 6781



NGC 6790



Vy 2-2



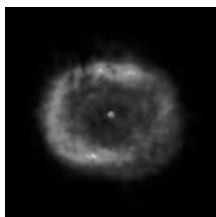
NGC 6803



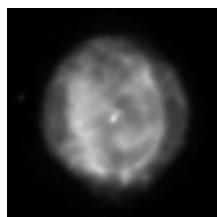
NGC 6804



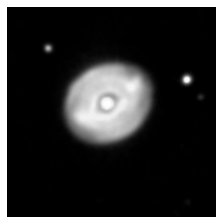
NGC 6807



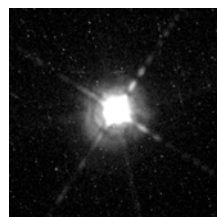
BD+30 3639



NGC 6818



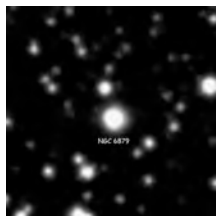
NGC 6826



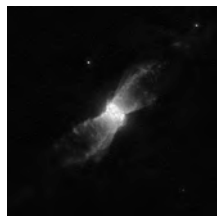
NGC 6833



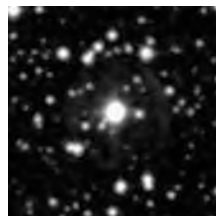
M27



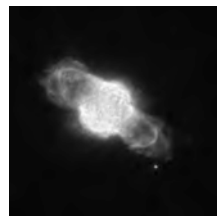
NGC 6879



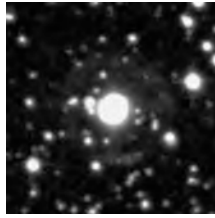
NGC 6881



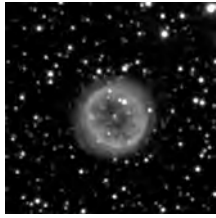
NGC 6884



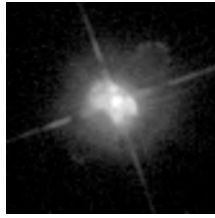
NGC 6886



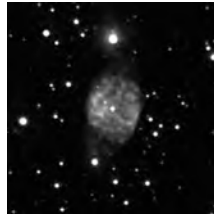
NGC 6891



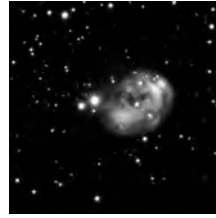
NGC 6894



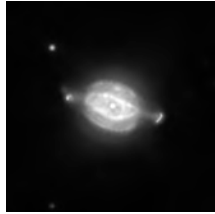
IC 4997



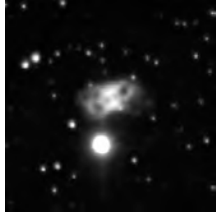
NGC 6905



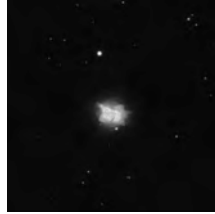
NGC 7008



NGC 7009



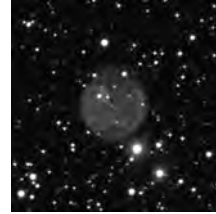
NGC 7026



NGC 7026



Sh 1-89



NGC 7048



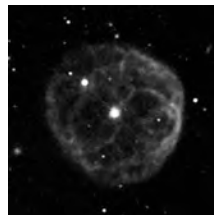
Pease 1



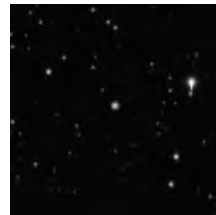
IC 5117



Hu 1-2



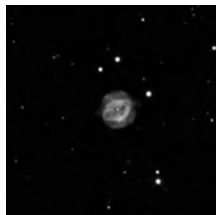
NGC 7094



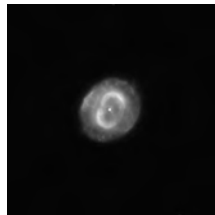
IC 5217



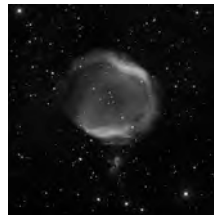
NGC 7293



NGC 7354



NGC 7662



Jones 1



Abell 82