In situ instabilities in wind-driven shells of BCDs

Is this a viable proposal?

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Proposal

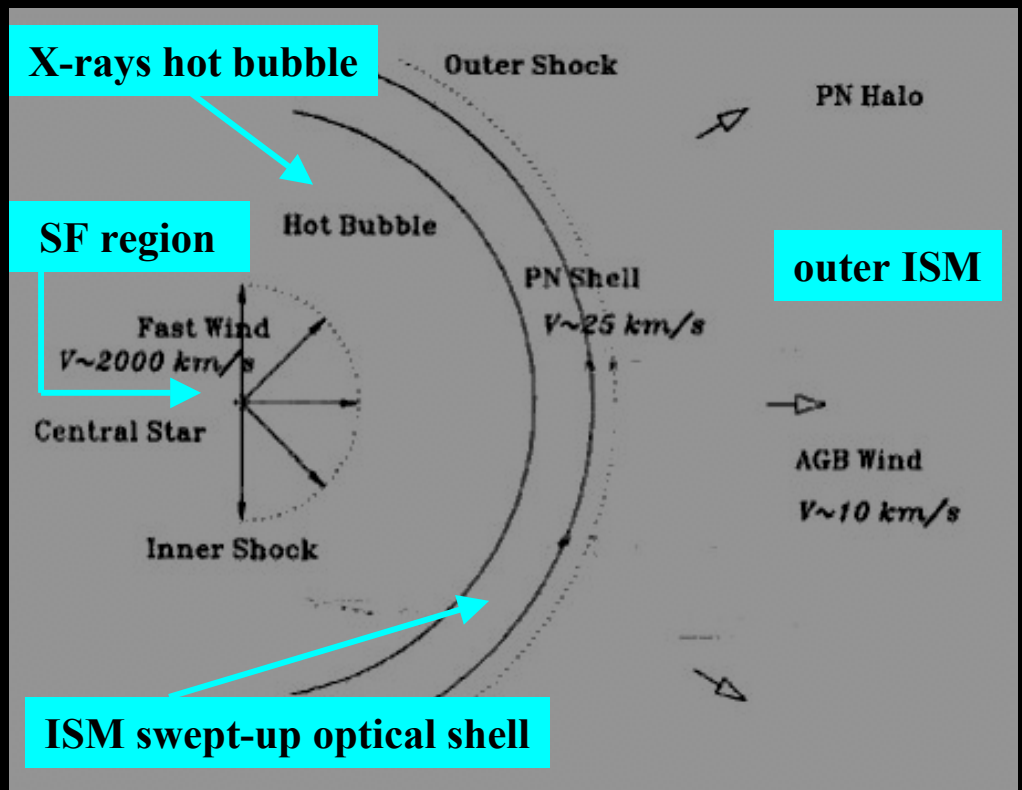
In situ instabilities could affect the chemical evolution of BCDs

- Since the wind-driven shells interacting with the ISM determine the conditions for a *blow-away* (loss of ISM gas to the IGM)...
- And, since dynamical instabilities naturally appear in such interactions...
- What would be the effect of Rayleigh-Taylor, Kelvin-Helmholtz or Vishniac instabilities on the mixing of the enriched gas with the gas of the outer regions of the galaxy?
- The idea is investigate their effects even in the objects that do not have the conditions for the a blow-away phenomenon!

What are the correlated observables?

Similar processes in PNe

Interacting stellar wind model for the formation of a PN



Why study this interaction in the wind-driven shells of BCDs?

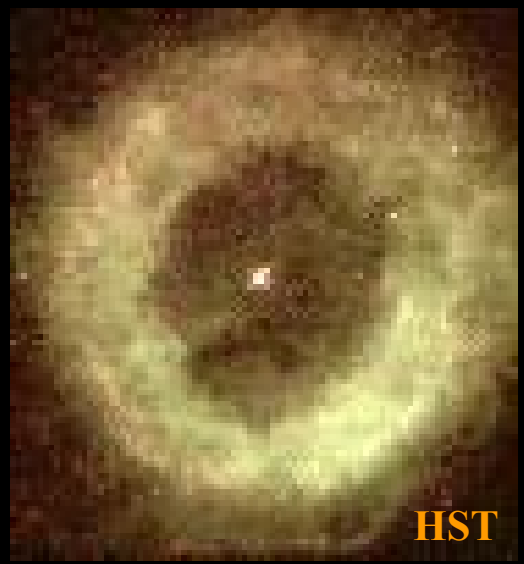
Martin 1997 (ApJ, 491, 561)
1998 (ApJ, 506, 222)
Studying the DIG has shown that:

- the swept-up shells allow significant lifting of hot/enriched gas out of the SF region

- regardless of whether any shell material escapes from the galaxy

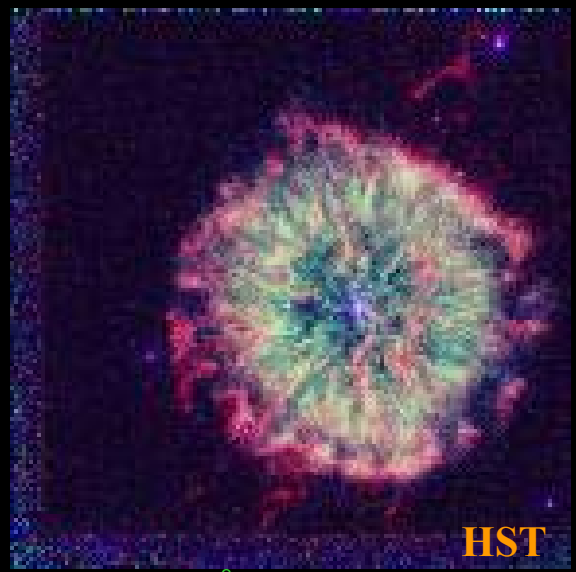
From the observations of PNe shells

NGC 6369



[OIII]4959+5007Å

NGC 6751



[OIII]5007Å emission
[NII]6583Å emission
[OIII]4959+5007Å emission

NGC 6369 m_B=16.6
0.7 < D (kpc) < 2.0

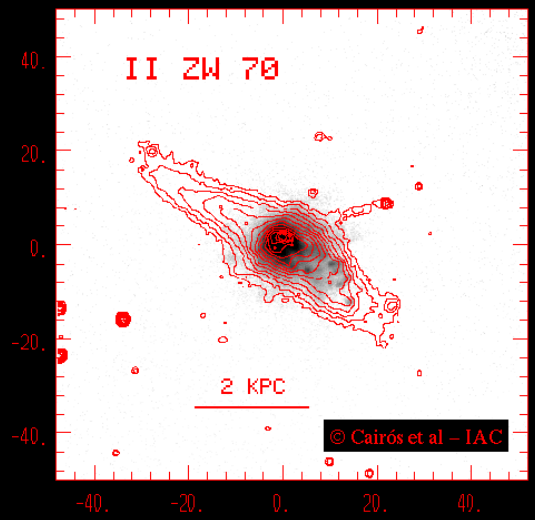
NGC 6751 m_B=15.78
1.4 < D (kpc) < 2.7

Well defined or fragmented shells!

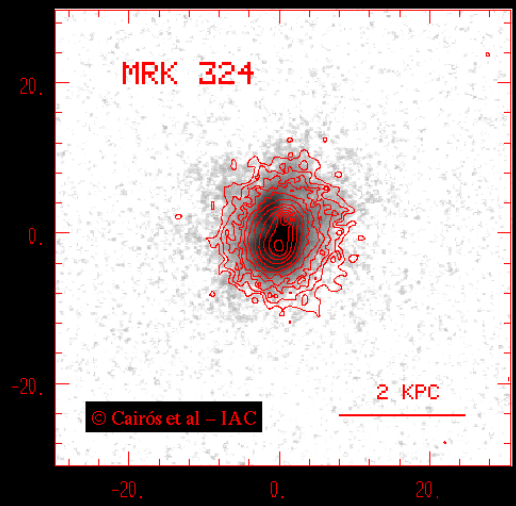
The selected BCDs

Cairós et al. 2001 (ApJS, 136, 393)
Cairós et al. 2001 (ApJS, 133, 321)

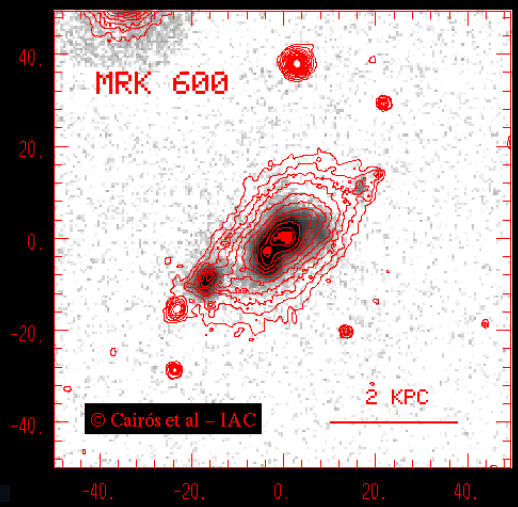
Hα map + B contours



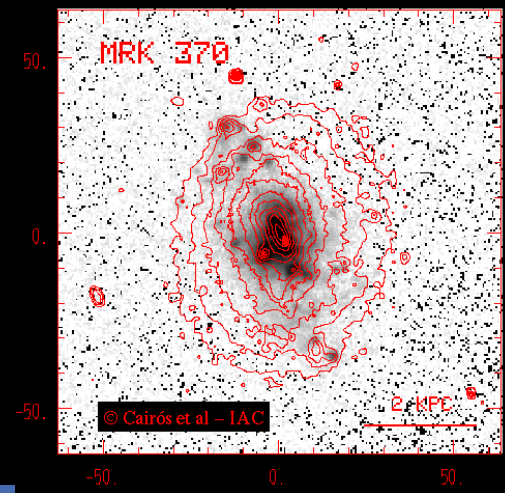
D=17.1 Mpc



D=24.7 Mpc



D=15 Mpc

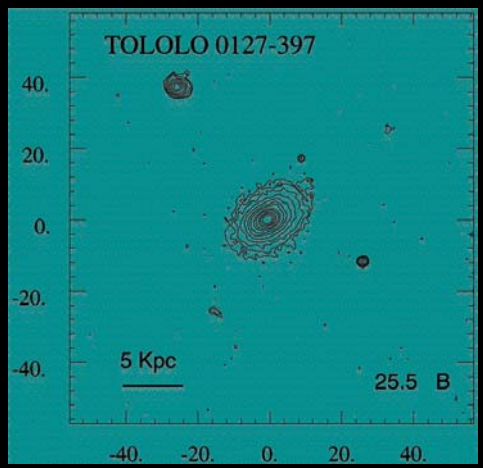


D=12.9 Mpc

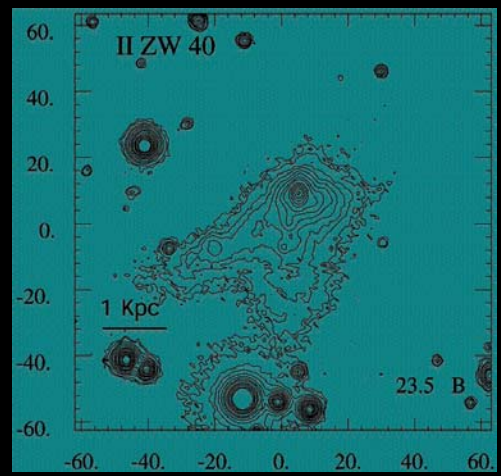
The selected BCDs

Cairós et al. 2001 (ApJS, 133, 321)

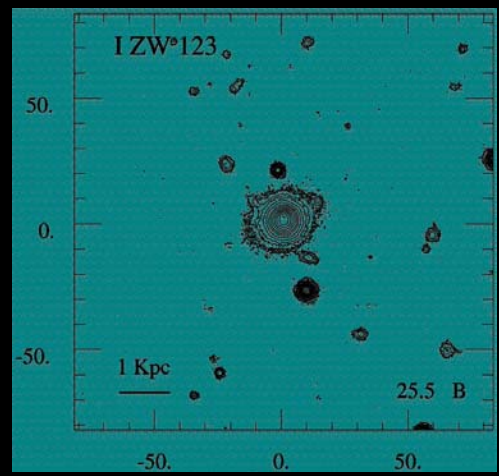
Hα contours



M_B=-18.36; D=64Mpc



M_B=-17.11; D=l0.1Mpc



M_B =-14.75; D=10.9Mpc

Note: images obtained with the 1.0m JKT, 2.2m CAHA and 2.5m NOT reaching surface brightness as low as **10^{-17} erg cm^{-2} s^{-1}**
spatial **resolution > 1 arcsec**

The sample studied by Martin (1998)

Name	D (Mpc)	M_B
VII Zw 403	3.6	-13.68
Sextans A	1.31	-13.84
I Zw 18	10.0	-13.84
II Zw 40	10.1	-14.54
NGC 3738	4.0	-16.08
NGC 1800	8.1	-16.67
NGC 2363	3.6	-16.75
NGC 1569	2.2	-17.26
NGC 2537	7.5	-17.36
NGC 3077	3.6	-17.37
NGC 4861	7.5	-17.20
NGC 5253	4.1	-17.62
NGC 4214	3.6	-17.65
NGC 4449	3.6	-17.86

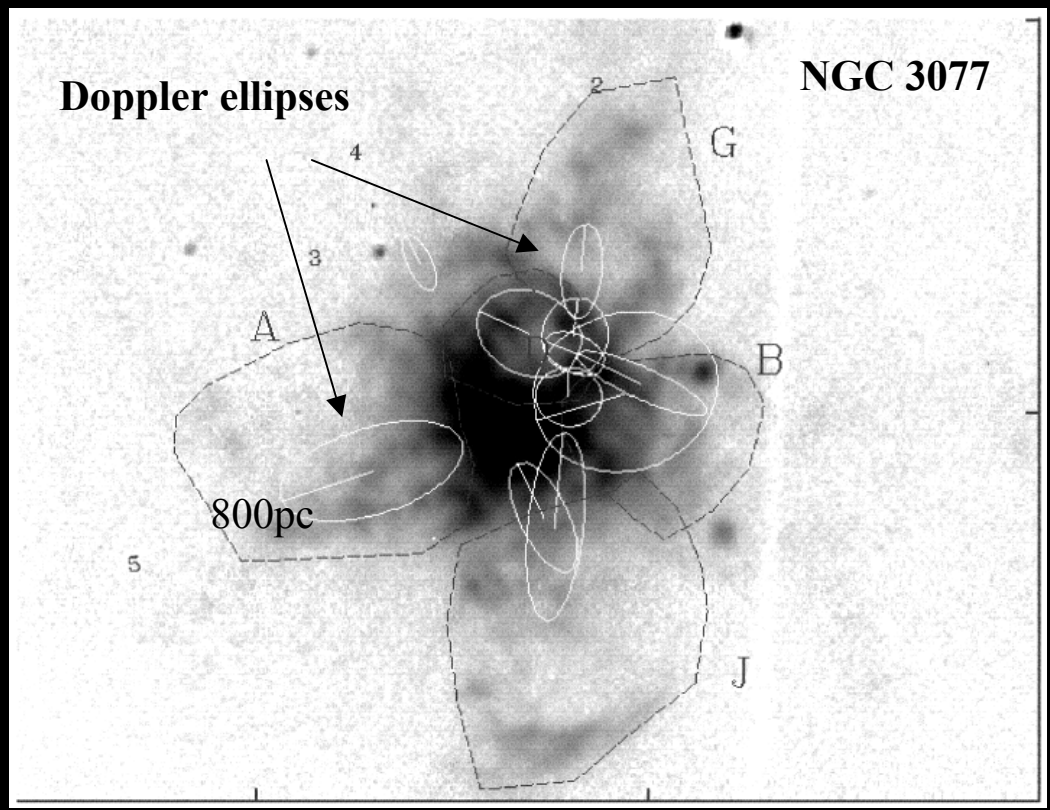
- D_{max} = 10 Mpc
- 2.3m and 4m telescopes
- Images were sensitive to surface brightness (Ha+[NII]) higher than **4×10^{-17} ergs $s^{-1}cm^{-2}arcsec^{-2}$**.

Able to identify knots and shells, using narrow band images and long-slit Spectroscopy, but not the ¨porosity¨ of the shells.

Important questions related to the proposal

What are the processes responsible for the lifting of the hot gas when blow-away is not present ?

Location of the identified supershells



Martin (1998)

In situ instabilities are important if the shell is expanding through an ***inhomogeneous ISM***.

As considered in the **mass loading** models by Pittard, Hartquist & Dyson 2001 A&A, 373, 104)

What about the shell-shell interactions? Are they resolved either in the observations or in the simulations ?

How deep should our Hα imaging be to allow the detection of the "holes" in the swept-up shells?

Will we need HST spatial resolution?