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Magnetic support of the optical emission line filaments in NGC 1275

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Supplementary Notes

We show a complete red, green and blue image in Supplementary Figure 1 and the H α emission contrasted with the blue emission (mainly young stars) in Supplementary Figure 2. Part of the blue stellar emission to the N of the nucleus is from the High Velocity System (HVS) which is superimposed on NGC 1275, yet must lie 100 kpc or more closer to us (Sanders & Fabian 2007). The 'spray' of stars to the north is also likely due to the HVS.

In Supplementary Figure 3 the H α emission is overlaid on a 2–8 keV Chandra X-ray image. This X-ray band emphasises the pressure of the hot intracluster gas and thus shows the weak shock surrounding the radio bubbles north and south of the centre. It is interesting that the tangential filaments which lie at the ends of several radial filaments (e.g. to the south and west) occur close to this shock.

Closeup images of several features are shown in Supplementary Figure 4. To the left is a 'fossil fish'-like structure which straddles the weak shock to the SE. The 'tail' of the 'fish' has fine structure. The south and east tangential filaments shown in the centre and right images consist of several parallel fine structures.

To assess the thickness of the fine threads we have examined cuts through several of them (Supplementary Figure 5). The images have been drizzled onto 0.025 arcsec pixels so 40 pixels correspond to one arcsec. The profiles left to right correspond to the boxes left to right with the profile of a typical star overlaid in red. The stellar profile is obviously narrower than any of the filaments.

References

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Colour image created by combining the data using the three ACS filters. The three images were processed with the method of Lupton et al (2004) to preserve the colour of objects avoiding saturation. The detail in the H α filaments was enhanced by using the unsharp mask filter in the GNU Image Manipulation Tool.



Comparison of the H α filaments (in red) with the distribution of blue light (in blue). The galactic continuum in the two images was removed by subtracting scaled green images.



Comparison of the H α filaments with the hard X-ray emission from the intracluster medium. The H α image was formed from the red image, subtracting continuum and stellar-sources using SExtractor (as in Fig 2 in the main paper). The X-ray image is 900ks of Chandra data (Fabian et al 2006) in the 2 to 7 keV band, smoothed with a Gaussian with $\sigma = 1.5$ arcsec.



Detail of the 'Fish' and the south and west tangential filamentary regions. These are parts of the red image, showing the H α filaments after subtracting the galactic continuum and stellar-sources using SExtractor (as in Fig 2 in the main paper).



1-D H α flux profiles of the sections of the filaments marked by boxes. The solid axes of the boxes shows the direction of the profile, which were collapsed along the dotted axes. The profiles were extracted from the raw red image for the four extraction regions shown. A typical stellar profile ($FWHM \sim 4$ pixels) is overlaid in red, which is less extended than any of the filament profiles (≥ 7 pixels). The x-axis is in units of arcsec (pixels are 0.025 arcsec wide), the y-axis is intensity in arbitrary units.

Supplementary Table 1 - Log of observations

Pointing	RA(2000)	Dec (2000)	Date	Filter	Exposure(s)	p.a.(deg)
NGC1275-SW	3 19 45.3	41 30 40.0	2006-07-29	F435W	815.0	260.3
NGC1275-SW	3 19 45.6	41 30 40.7	2006-07-29	F435W	815.0	260.3
NGC1275-SW	3 19 45.8	41 30 41.5	2006-07-29	F435W	815.0	260.3
NGC1275-SW	3 19 45.3	41 30 40.0	2006-07-30	F435W	824.0	260.3
NGC1275-SW	3 19 45.6	41 30 40.7	2006-07-30	F435W	824.0	260.3
NGC1275-SW	3 19 45.8	41 30 41.5	2006-07-30	F435W	824.0	260.3
NGC1275-SE	3 19 50.5	41 30 40.0	2006-08-04	F435W	815.0	257.9
NGC1275-SE	3 19 50.8	41 30 40.9	2006-08-04	F435W	815.0	257.9
NGC1275-SE	3 19 51.0	41 30 41.7	2006-08-04	F435W	815.0	257.9
NGC1275-SE	3 19 50.5	41 30 40.0	2006-08-05	F435W	824.0	257.9
NGC1275-SE	3 19 50.8	41 30 40.9	2006-08-05	F435W	824.0	257.9
NGC1275-SE	3 19 51.0	41 30 41.7	2006-08-05	F435W	824.0	257.9
NGC1275-NW	3 19 45.3	41 31 60.0	2006-08-08	F550M	806.0	256.4
NGC1275-NW	3 19 45.3	41 31 60.0	2006-08-08	F550M	806.0	256.4
NGC1275-NW	3 19 45.6	41 32 0.9	2006-08-08	F550M	806.0	256.4
NGC1275-NW	3 19 45.6	41 32 0.9	2006-08-08	F550M	806.0	256.4
NGC1275-NW	3 19 45.8	41 32 1.9	2006-08-08	F550M	806.0	256.4
NGC1275-NW	3 19 45.8	41 32 1.9	2006-08-08	F550M	806.0	256.4
NGC1275-SW	3 19 45.3	41 30 40.0	2006-07-29	F550M	806.0	260.3
NGC1275-SW	3 19 45.3	41 30 40.0	2006-07-29	F550M	806.0	260.3
NGC1275-SW	3 19 45.6	41 30 40.7	2006-07-29	F550M	806.0	260.3
NGC1275-SW	3 19 45.6	41 30 40.7	2006-07-29	F550M	806.0	260.3
NGC1275-SW	3 19 45.8	41 30 41.5	2006-07-29	F550M	806.0	260.3
NGC1275-SW	3 19 45.8	41 30 41.5	2006-07-29	F550M	806.0	260.3
NGC1275-SW	3 19 45.3	41 30 40.0	2006-07-29	F550M	813.0	260.3
NGC1275-SW	3 19 45.3	41 30 40.0	2006-07-29	F550M	813.0	260.3
NGC1275-SW	3 19 45.6	41 30 40.7	2006-07-29	F550M	813.0	260.3
NGC1275-SW	3 19 45.6	41 30 40.7	2006-07-29	F550M	813.0	260.3
NGC1275-SW	3 19 45.8	41 30 41.5	2006-07-29	F550M	813.0	260.3
NGC1275-SW	3 19 45.8	41 30 41.5	2006-07-29	F550M	813.0	260.3
NGC1275-SE	3 19 50.5	41 30 40.0	2006-08-04	F550M	806.0	257.9
NGC1275-SE	3 19 50.5	41 30 40.0	2006-08-04	F550M	806.0	257.9
NGC1275-SE	3 19 50.8	41 30 40.9	2006-08-04	F550M	806.0	257.9
NGC1275-SE	3 19 50.8	41 30 40.9	2006-08-04	F550M	806.0	257.9
NGC1275-SE	3 19 51.0	41 30 41.7	2006-08-04	F550M	806.0	257.9
NGC1275-SE	3 19 51.0	41 30 41.7	2006-08-04	F550M	806.0	257.9
NGC1275-SE	3 19 50.5	41 30 40.0	2006-08-04	F550M	813.0	257.9
NGC1275-SE	3 19 50.5	41 30 40.0	2006-08-04	F550M	813.0	257.9
NGC1275-SE	3 19 50.8	41 30 40.9	2006-08-04	F550M	813.0	257.9
NGC1275-SE	3 19 50.8	41 30 40.9	2006-08-04	F550M	813.0	257.9
NGC1275-SE	3 19 51.0	41 30 41.7	2006-08-05	F550M	813.0	257.9
NGC1275-SE	3 19 51.0	41 30 41.7	2006-08-05	F550M	813.0	257.9
NGC1275-NW	3 19 45.3	41 31 60.0	2006-08-08	F625W	827.0	256.4
NGC1275-NW	3 19 45.6	41 32 0.9	2006-08-08	F625W	827.0	256.4
NGC1275-NW	3 19 45.8	41 32 1.9	2006-08-08	F625W	827.0	256.4
NGC1275-SW	3 19 45.3	41 30 40.0	2006-07-29	F625W	827.0	260.3
NGC1275-SW	3 19 45.6	41 30 40.7	2006-07-29	F625W	827.0	260.3
NGC1275-SW	3 19 45.8	41 30 41.5	2006-07-29	F625W	827.0	260.3
NGC1275-SW	3 19 45.3	41 30 40.0	2006-07-29	F625W	827.0	260.3
NGC1275-SW	3 19 45.6	41 30 40.7	2006-07-29	F625W	827.0	260.3
NGC1275-SW	3 19 45.8	41 30 41.5	2006-07-30	F625W	827.0	260.3
NGC1275-SE	3 19 50.5	41 30 40.0	2006-08-04	F625W	827.0	257.9
NGC1275-SE	3 19 50.8	41 30 40.9	2006-08-04	F625W	827.0	257.9
NGC1275-SE	5 19 51.0 2 10 50 5	41 30 41.7	2006-08-04	F025W	827.0	257.9
NGC1275-SE	3 19 30.3 2 10 50 0	41 30 40.0	2006-08-05	F025W	827.0	257.9
NGC1275-SE	3 19 50.8	41 30 40.9	2006-08-05	F625W	827.0	257.9
NGC12/5-SE	5 19 51.0	41 30 41.7	2006-08-05	F025W	827.0	237.9