A new picture of M82/ **Björn Adebahr**

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M82 in a nutshell

- Morphological Type: Irr II
- Diameter: 13.4' x 8.5'
- Distance: 3.63 Mpc
- Mass: 6·10⁹ Μ_{.0}
- SFR: 10 M_o/yr
- Inclination: 77°
- Nuclear starburst
- Bipolar outflow
- Central region very dense
- No supermassive black hole



The M81-/M82-Group

M81/M82/NGC3077 form up the core of the group

- Tidal interactions between all three galaxies (Yun et al. 1994)
- Three galaxies with different morphologies and evolutionary stages
- Synchrotron emission not only originating from the nucleus of M82
 - \rightarrow Disc is actively star-forming



Halo Morphology of M82

- Centers of X-Ray-emission and Radio Continuum emission do not align
- Northern halo more diffuse than southern halo at Radio- and X-Ray-wavelengths

Declination (J2000)

Slope of Brightness profiles should be steeper in the southern halo



Adebahr et al. in prep.

Compression in the halo of M82



Adebahr et al. in prep.

Compression in the southern halo due to interaction with the group medium

Cosmic ray propagation



- Flat cosmic ray spectrum to the South and Northwest
- X-Ray-emission seems to favor regions with low spectral index
- Observation suffers from
 different resolutions

Diffusion or Reacceleration?



Adebahr et al. in prep.

Only from the spectral index we cannot distinguish between diffusion and reacceleration, but...

...we have Rotation Measures



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Summary

- M82 is very complex and still not fully understood
- Radio continuum emission rises not only from the nucleus into the halo
 - \rightarrow Nuclear starburst + disc wind
- Compression in the southern halo
- X-Ray-Emission seems to follow the flat spectral indexes
 - \rightarrow Medium around M82 is not homogeneous
- Reacceleration in the halo due to turbulent magnetic fields with multiple and/or Faraday-thick structures
- Additional 6cm archival VLA-data will give us more constraints

Thank you for your attention!

Björn Adebahr | A new picture of M82 | Schloss Ringberg | 21-07-2011