Soft X-ray emission of polars



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in collaboration with

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Standard accretion scenario in polars



Vadim Burwitz (MPE, Garching)



Klaus Reinsch

X-ray Universe 2008, Granada, Spain • 27-30 May 2008



Soft X-ray spectral properties and variability

this talk:

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- prototype system AM Her
- comparison of Chandra LETG and ROSAT PSPC spectra
- time-averaged temperature distribution
- short-term spectral variability related research on polars using XMM, see:
- previous talk by A. Schwope

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• posters C.5 (R. Schwarz) & C.8 (I. Traulsen)

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A

Chandra LETG spectrum of AM Her



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- corrected LETGS effective areas (Beuermann et al. 2006, 2008)
- soft component:
 2 blackbodies required
- hard component: bremsstrahlung + MEKAL

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ROSAT PSPC spectrum of AM Her



- improved PSPC detector response matrix for AO1 (Beuermann 2008)
- consistent with spectral • components derived from Chandra LETG spectrum



Temperature distribution in the accretion spot of AM Her



Beuermann et al., in prep.

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AM Her fit parameter





Short-term variability





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Short-term spectral variability



- ROSAT PSPC high state observation of AM Her (1.3 million counts)
- time bins 20 sec
- column density fixed to best fit of mean brightphase spectrum
- emitting areas $A = 3.4 \ 10^{14} \ cm^2$ (dashed) $A = 7.9 \ 10^{14} \ cm^2$ (middle) $A = 1.7 \ 10^{15} \ cm^2$ (lower)

Beuermann et al., 2008





Soft X-ray emission of polars Conclusions

- rapid soft X-ray spectral variability during high state of AM Her
- bb-temperature correlated to count rate
 => local heating and cooling in response to density variations of accretion stream
- soft X-ray emitting area (~ 10¹⁵ cm²) much smaller than UV spot (≥ 10¹⁷ cm²)
- wide range of temperatures (~ 10 ... 45 eV) present in accretion spot

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