FATAL LATEX COMPILATION ERROR(s)

To view full GitHub Actions output, click on item at top of list here:

https://github.com/pmarcum/SAUNAS$_I$II/actions/runs/11775511169/job/32796099303

>>

FATALERRORSINmyPaper.tex

>>

./myPaper.tex : 132 : Undefinedcontrolsequence.

Line132 −

new

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>>

WARNINGSINmyPaper.tex

>>

LaTeXWarning : Reference‘sec : methods′onpage4undefinedoninputline142.

LaTeXWarning : Reference‘sec : DIS′onpage4undefinedoninputline142.

Line142 −

Thispaperisorganizedasfollows.ThedatasetsandmethodologypipelineisdescribedinSec. **??**.TheresultsarepresentedinSec. **??**.Thediscuss

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LaTeXWarning : Reference‘tab : Observations′onpage4undefinedoninputline188.

Line188 −

Atotalof9.92 ksof observations, usingthe**VFAINT**mode, havebeenarchivedforNGC 5084(ACIS − I, Obs. ID : 12173, PI : Stephen Murr

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LaTeXWarning : Reference‘tab : Observations′onpage6undefinedoninputline197.

Line197 −

ProposalID : 6785, F702WandF658N, June1996), WFC3/IR(F160W, ProposalPI : Boizelle, Benjamin, ProposalID : 15909, andWFC

29.91±2.12 Mpc [6.90 arcsec kpc^{-1},][]koribalski+2004aj128$_1$6, andassumingaNyquistsampledPSF, thephysicalspatialresolutionscalesare

12 pc (WFC3/UVIS) and ∼ 36 pc (WFC3/IR), respectively. Table **??** *summarizes the available observations.*

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LaTeX Warning: Reference ‘fig:NGC5084’ on page 8 undefined on input line 222.

Line 222 ——————–

?? *in section* **??**

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LaTeX Warning: Reference ‘fig:NGC5084’ on page 8 undefined on input line 247.

Line 247 ——————–

Figure **??** *presents the new -processed images in the selected broad X-ray band (0.3–2.0 keV), overlayed on the optical morphology of the galaxy [large FOV optical and near-infrared gri image from Pan-STARRS,][]chambers+2016arXiv1612.05560. Additionally, Fig.* **??** *in Appendix* **??** *shows the three X-ray (soft: 0.3-1.0 keV,* medium: *1.0-2.0 keV,* hard: *2.0 - 8.0 keV) bands.*

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LaTeX Warning: Reference ‘fig:NGC5084’ on page 9 undefined on input line 252.

Line 252 ——————–

flux inside the 3σ contour in Fig. **??***; (2) Core (R < 10”); (3) Extended emission (10” < R < 1.5′, and > 3σ); and (4-7) North, West, South, and East lobes. The lobe regions are defined by dividing the extended emission in 4 quadrants (with separations at 45°, 135°, 225°, 315°), excluding the emission from the core (R < 10”) with a limit at R = 1.5′. The separation between the core and extended regions R = 10” is defined based on the inspection of the X-ray morphology as the maximum radius where the X-ray emission does not show a significant elongation. The results are presented in Table* **??***. The fluxes take into account PSF deconvolution, and they exclude the emission from point sources identified by the catalog of point sources (XRBs, AGN core). The analysis shows that the integrated emission from the north and east lobes is in excess of a 10σ detection. The south and west are substantially dimmer but significant above the background at 6.6σ and 3.2σ.*

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LaTeX Warning: Reference ‘fig:NGC5084’ on page 9 undefined on input line 257.

Line 257 ——————–

In order to verify the results from the pipeline, we study the significance of the extended emission in Appendix **??** *using two different, additional methodologies widely used in the literature. First, we determine if there is an excess of emission around the bright core of the galaxy by comparing the PSF surface brightness profile with the observed profile in the original /ACIS observations, without applying Voronoi binning or PSF deconvolution. This methodology has been extensively used in the literature fabbiano+2017apj842$_4$, fabbiano+2018apj855$_1$31, jones+2020apj891$_1$33, ma+2020apj900$_1$64, ma+2023apj948$_6$1toidentifyhotgashalosandotherextendedemissioncompone contours on Fig.* **??***, confirming that the X-ray emission of NGC 5084 is not caused by PSF-scattered light from the bright core and that the extended emission is significant.*

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LaTeX Warning: Reference ‘fig:NGC5084$_h st' on page 10 undefined on input line 293.$
$Line 293 ------------------------$
$To further investigate the nature of this complex emission, we explored the available HST observations of NGC\,5084 (see Table ??), presented i$
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$LaTeX Warning: Reference ‘fig:NGC5084_h st' on page 12 undefined on input line 314.$
$Line 314 ------------------------$
$The results are shown in the right panel of Fig. ??. The model ellipse fit is shown displaced from the observed disk for clarity. The center of the ellip$
$(2000701, -218272) \pm 0.1$ arcsec, compatible with the location of the core of the galaxy. The disk diameter is $D = 304^{+10}_{-11}$ pc, with a median inclination of $i = 71.2^{+1.8}_{-1.7}$ degrees, and a position angle of $\theta = -5.1^{+1.1}_{-1.0}$ degrees, indicating that the relative orientation of the circumnuclear disk is perpendicular to the galactic plane.
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LaTeX Warning: Reference ‘fig:ALMA’ on page 12 undefined on input line 323.
Line 323 ————————–
The positions that do not contain emission with an associated intensity higher than the noise at a 95% probability confidence level are masked. The velocity map (moment 1) of the CO(2-1) emission lines is represented in a color scale over the F702W HST/ACS image in the right panel of Fig. **??**. The results show an unmistakable edge-on rotation pattern, with the north (south) edge of the disk moving towards (away from) the observer along the line of sight. The peaks of CO(2-1) emission are coincident with the edges of the circumnuclear disk, where the column density is expected to be highest due to projection effects.

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LaTeX Warning: Reference ‘fig:ALMA’ on page 12 undefined on input line 325.
Line 325 ————————–
The spectra of the locations with significant emission are combined (summed) to study the line profile and characterize the amplitude of the rotation pattern. The combined spectra is shown in the left panel of Fig. **??**. We characterize the rotation amplitude using the line width at the half-maximum, following a similar procedure as in $[W_{50},][]smith+2021mnras500_1 933. The velocities (lowest and highest) at which$
$maximum are measured through interpolation of the combined spectra. This process is repeated using N=1000 Monte Carlo simulations, with e$
$249.1^{+12.8}_{-9.6}$ km s^{-1} ($W_{50} = 498^{+26}_{-19}$ km s^{-1}).

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LaTeX Warning: Reference ‘tab:Radio$_L obes' on page 13 undefined on input line 353.$
$Line 353 ------------------------$
$Interestingly, wiegert+2015aj150_8 1 identifies extended emission to the east and west of the central bright core. This emission is highlighted in$
level, being located at a symmetric distance from the core. The distance from the east lobe to the core is $R = 31.5^{+4.5}_{-4.5}$ arcsec or $R = 4.52^{+0.66}_{-0.65}$ kpc, while the equivalent from the west lobe is $R = 31.1^{+4.5}_{-4.6}$ arcsec ($R = 4.51^{+0.65}_{-0.67}$ kpc), being compatible at a 3σ confidence level. The position angles from the east and west lobes to the center are also compatible at a 3σ level, $PA_{\rm east-core} = 92.8^{+6.4\circ}_{-7.1}$, $PA_{\rm core-west} = 92.2^{+7.1\circ}_{-7.6}$. Taking into account the inclination of the circumnuclear disk ($i = 71.2^{+1.8\circ}_{-1.7}$), and assuming that the lobes are oriented along the line of the AGN radio jet axis, the deprojected distance to the core is $R = 4.8 \pm 0.70$ kpc, taking into account the uncertainties in the location of the core, radio lobes, and inclination. The results are compatible at the 1.4 and 5 GHz bands. The total luminosity of each lobe in 5 GHz is $L_{\rm 5GHz} = [1.5, 1.8] \times 10^{+19}$ W Hz^{-1} while the core is two orders of magnitude brighter with $L_{\rm 5GHz,core} = 3.60 \pm 0.01 \times 10^{+21}$ W Hz^{-1}. In 1.4 GHz, the lobes are brighter $L_{\rm 1.4GHz} = [4, 6] \times 10^{+19}$ W Hz^{-1}, with $L_{\rm 5GHz,core} = 3.60 \pm 0.01 \times 10^{+21}$ W Hz^{-1} in the core. The distances to the core of each lobe and the luminosities of each component are included in Table **??**.
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LaTeX Warning: Command $\mathring{i}$nvalid in math mode on input line 440.
Line 440 ————————–
using five regions: (1) the central 1.5 arcsec from the core of the galaxy; (2-5) north, south, east, and west sides of the galaxy, resp. (not including the core). The results are shown in Fig. **??**. The APO/DIS spectra do not reveal any signs of Hα [$\lambda = 6562.8$Å], Hβ [$\lambda = 4861.35$Å], or Hγ [$\lambda = 4340.47$Å] absorption, in any of the regions analyzed, suggesting that the stellar population at the core is not dominated by a classic post-starburst stellar population.
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LaTeX Warning: Reference ‘subsec:discussion$_f aded starburst' on page 18 undefined on input line 472.$
$Line 472 ------------------------$
$These scenarios are idealized; in reality, a mixture of these cases may be responsible for the observed phenomena. In particular, the HI tilt and th$
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$LaTeX Warning: Reference ‘subsec: discussion_f aded starburst' on page 18 undefined on input line 480.$
$Line 480 ------------------------$
$Summary of the formation scenarios for the vertical X-ray emission of NGC\,5084. Cosmic time increases from left to right.$ Top row:$(1) Or$
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$LaTeX Warning: Reference ‘fig: NGC5084' on page 20 undefined on input line 523.$
$Line 523 ------------------------$
$NGC\,5084 color maps.$ Left panel:$Ground-based VLT/ATLAS$ g-i maps$. Black contours represent the X-ray emission (see Fig. ??). Dark blu$
$F702W color from$ Hubble $WFPC2/WFC3 photometry. The circumnuclear disk is clearly visible in red. See the colorbar for reference.$

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LaTeXWarning : Reference‘subsec : results$_{O}$ptical$_{s}$pectra′onpage20undefinedoninputline529.
Line529 −
Secondly, theopticalspectra(seeSec. ??, Fig. ??)donotpresentanyBalmerabsorptionlinestypicalofpost − starburstobjects[alsocalledE +
ule2in0.7pt
LaTeXWarning : Reference‘tab : Radio$_{L}$obes′onpage22undefinedoninputline537.
Line537 −
Unfortunately, thesystematiceffectsobservedinradioobservationsalongtheverticaldirection(Sec. ??)preventtheidentificationofadditio
5 orders of magnitude less than the X-shaped radio galaxies from cheung+2009apj181$_{5}$48.Thisclassificationcorrelateswiththepredictionfr
shapedsourcesshouldbedecayingAGNjets.
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LaTeXWarning : Commandinvalidinmathmodeoninputline567.
Line567 −
AnotherexampleofsuchphenomenaisthelenticulargalaxyNGC 5252.ClassifiedasaSeyfert1.9galaxyargyle + 1990mnras243$_{5}$04, osterbr
5007Å that extends for $R \sim 20$ kpc. Hubble Space Telescope and Fabry–Pérot spectrograph observations of NGC 5252 by morse+1998apj505$_{1}$
20°) misalignment between the X-ray emission in soft bands (0.3–2.0 keV) and the optical major axis of the galaxy. The case of NGC 5252 shows that the combination of observational evidence such as the presence of off-axis morphological components and AGN-related features is one strategy to shed light on the formation pathways of specific galaxies.
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LaTeX Warning: Reference ‘sec:DIS’ on page 25 undefined on input line 591.
Line 591 ——————–
The horizontal (in-plane) component of the X-ray emission is aligned with both the rotation axis of the newly discovered circumnuclear disk and the symmetric radio lobes, identified by irwin+2019aj158$_{2}$1aspartofaradioAGNjet.Takingintoaccountallavailableobservationale
shapedX−rayemission : (1)itistheremnantofare−orientedAGN; (2)itisanoutflowgeneratedbyanoverpressuredcocoonofhotgaspowered
goingstarformationinthecore.Combiningthenewobservationalevidencepresentedinthispaperwithpreviousanalysisbasedonenvironment
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LaTeXWarning : Reference‘eq : F$_{l}$im$_{X}$ray′onpage27undefinedoninputline655.
Line655 −
AtE=1keVandt=10 ks, theequivalentexposure[2](M t)isapproximately3.8×10^{6} cm^{2} s^{1}. For a point source detection of $\sigma = 3$, with flux integration over an area associated with the PSF at the center of the ACIS detector (FWHM $\sim$ 1.1”), Eqn. ?? implies a limiting sensitivity of $f_{\rm lim} = 4 \times 10^{-15}$ erg cm^{-2} s^{-1}, equal to the reference instrument point source sensitivity limits.
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LaTeX Warning: Reference ‘tab:Xray$_{f}$lux′onpage29undefinedoninputline699.
LaTeXWarning : Reference‘fig : NGC5084$_{A}$perture$_{H}$istograms′onpage29undefinedoninputline699.
Line699 −
Inthissectionweassessthestatisticalsignificanceofthedetectionofthefour X − rayemissionlobesreportedinSec. ??, usingthePSFdeconv
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LaTeXWarning : Reference‘tab : Xray$_{f}$lux′onpage30undefinedoninputline701.
Line701 −
TheanalysisindicatesthatthesurfacebrightnessX − rayemissionintheaperturesissignificantlyhigherthanthatofthebackground.Thenu
north(p=6.8×10^{-7}), east ($p = 1.1 \times 10^{-6}$), south ($p = 1.3 \times 10^{-4}$) and west ($p \sim 0.01$). The fluxes integrated over the different apertures are tabulated in Table ??. This result supports and verifies the findings described in Sec. ?? and Appendix ??. We conclude that the extended X-ray emission detected by around NGC 5084 is (1) statistically significant; (2) independent of the PSF deconvolution process; and (3) independent of the Voronoi binning methodology applied.
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LaTeX Warning: Reference ‘sec:methods’ on page 30 undefined on input line 711.
Line 711 ——————–
Detection of the X-ray extended lobes around NGC 5084 without Voronoi binning. Left: /ACIS X-ray flux (0.3−2.0 keV) map rebinned to 12.2×12.2 arcsec (25×25 pixels) for visualization purposes. PSF deconvolution was applied [see Sec. ??, and][]borlaff+2024apj967$_{1}$69Color r
rayemissionintheNorth(blue), West(red), South(green), andEast(orange)lobes.Yellow contours:[2,3]σ (dotted, dashed respectively) detection limits as estimated by (see Sec. ??, for reference. Right: Color coded histograms represent the event probability distributions for the background (grey) and the four lobe apertures. The p-values for the null hypothesis that the flux distributions in the lobe apertures are compatible with the background are represented in the legend.
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CITATION ISSUES IN myPaper.tex
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Citation ‘ohlson+2024aj167$_{3}$1′onpage3undefinedoninputline118.
Line118 −
NGC 5084isoneofthemostmassivelenticulargalaxiesintheLocalUniverse[]ohlson + 2024aj167$_{3}$1, withatotaldynamicalmassofapproxim
koribalski+2004aj128$_{1}$6andamass − to − lightratio$\Upsilon \geq 65$. Several features of this galaxy make it an interesting case study.

[2] / exposure maps: https://cxc.cfa.harvard.edu/ciao/threads/expmap_acis_single/

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Line135 −
effectiveradiusR_e. For this galaxy, R_{25} is 20 times larger than R_e, in contrast to $R_{25} = 3.6 \times R_e$, the nominal average for spirals and
S0s measured by [][]williams+2009mnras400$_1$665.zaw + 2019apj872$_1$34classifiedNGC 5084asanAGNaccordingtothekewley + 2001apj556
truncatedsurfacebrightnessprofilecomeron + 2012apj759$_9$8, apotentialsignofpastgravitationalinteractions, suchasminorandmajorme
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Line141 −
ThisprojectisthesecondpublicationinaseriesthatwillstudythehotgashalosaroundgalaxiesusingX − rayobservationsfromthe X − rayobs
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Line192 −
Adaptivespatialbinningtechniques(Voronoi, CSMOOTH)cappellari + 2003mnras342$_3$45, ebeling + 2006mnras368$_6$5havebeenwidelyapp
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LISTOFREFERENCESINmyPaper.tex
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