

Discovery of a dust scattering halo from a Galactic Center transient

SWIFT J174540.7-290015

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University of Wisconsin - Madison

In collaboration with: F. Baganoff (MIT), G. Garmire, D. Haggard (McGill),
M. Reynolds (UMichigan), N. Degenaar (IoA, UK), B. Mon (McGill)

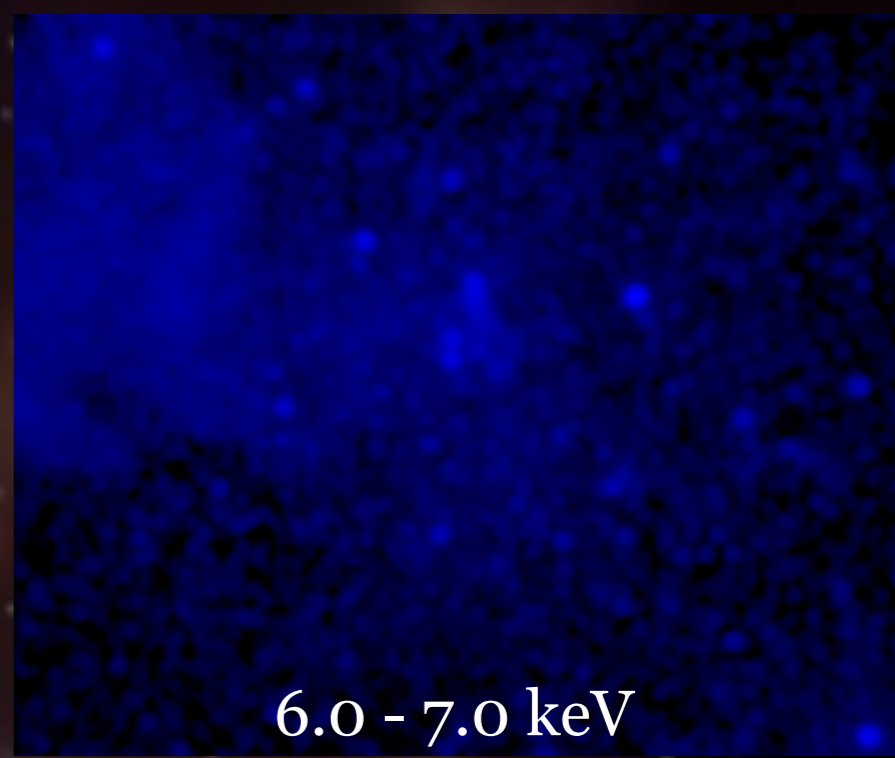
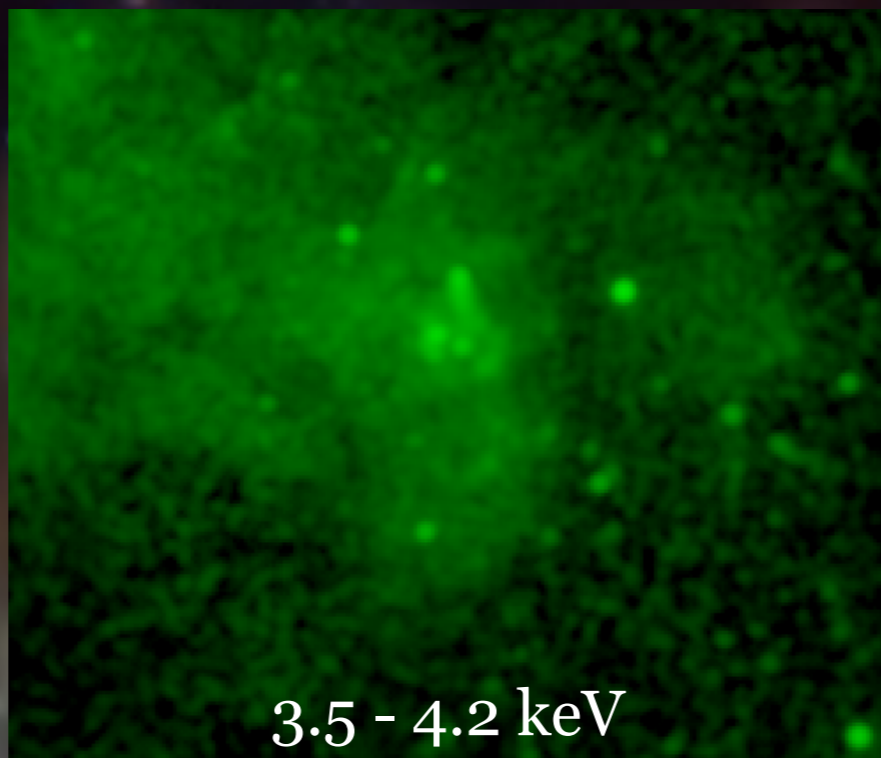
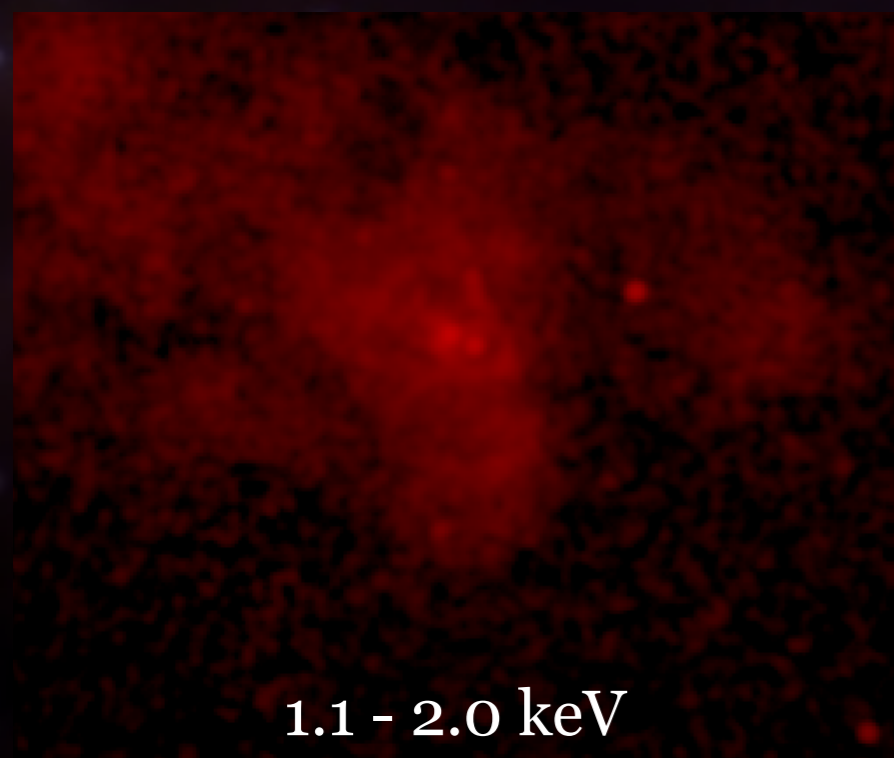
Chandra's View of the Galactic Center

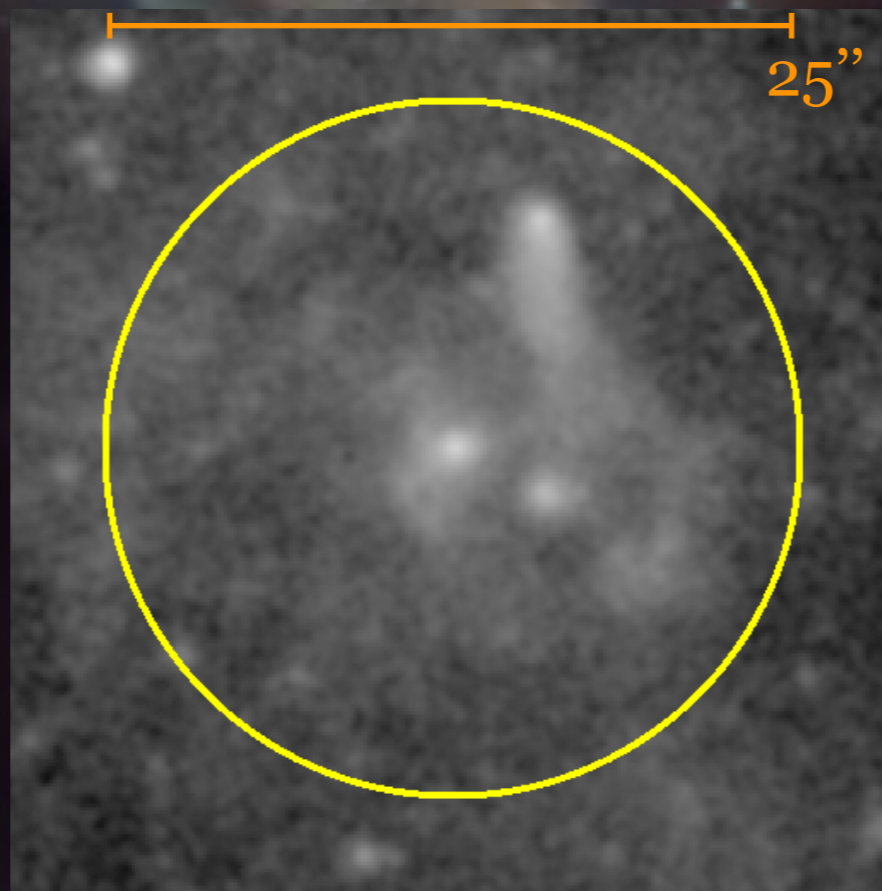
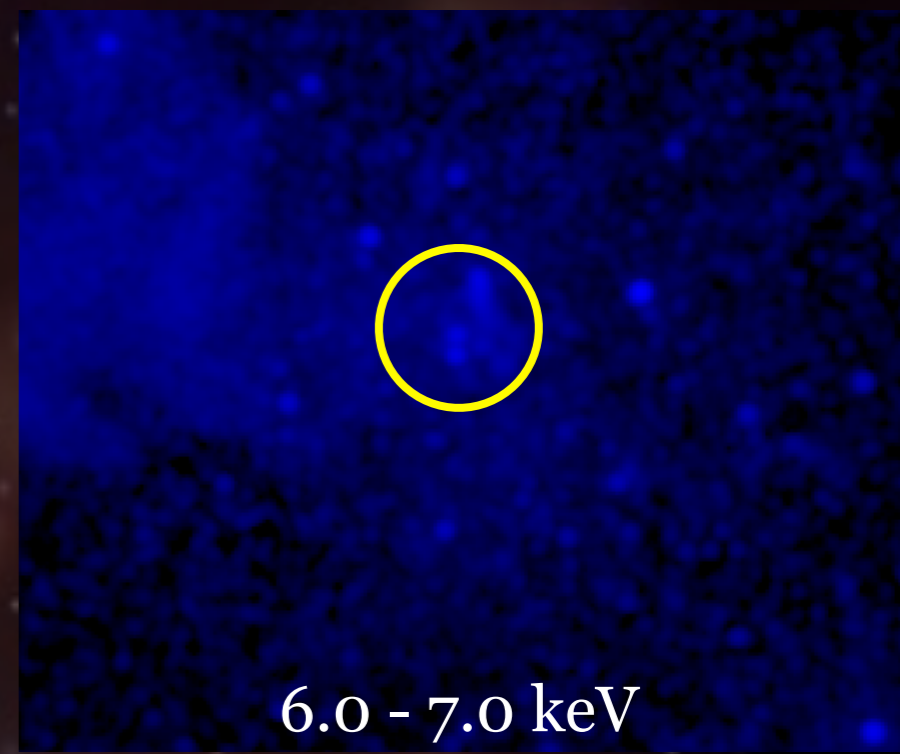
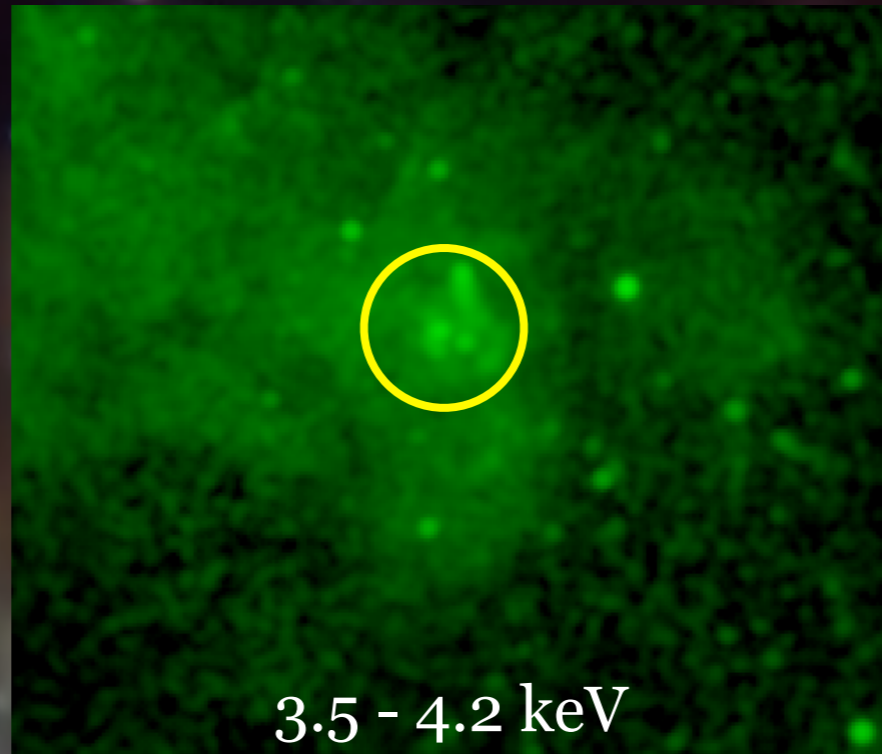
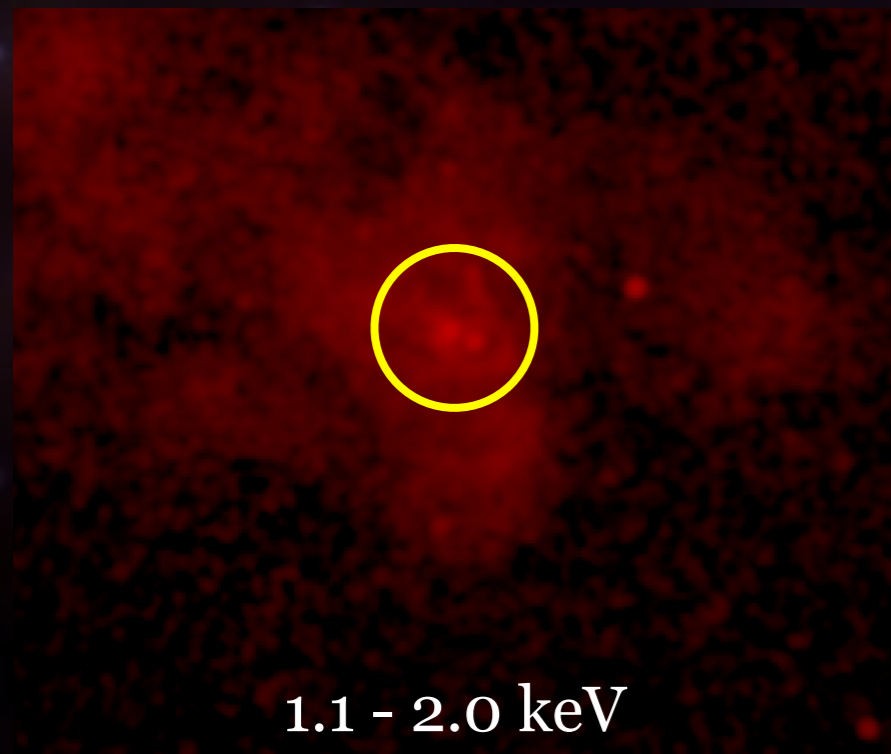


Image Credit: NASA/CXC/MIT/F.K.Baganoff

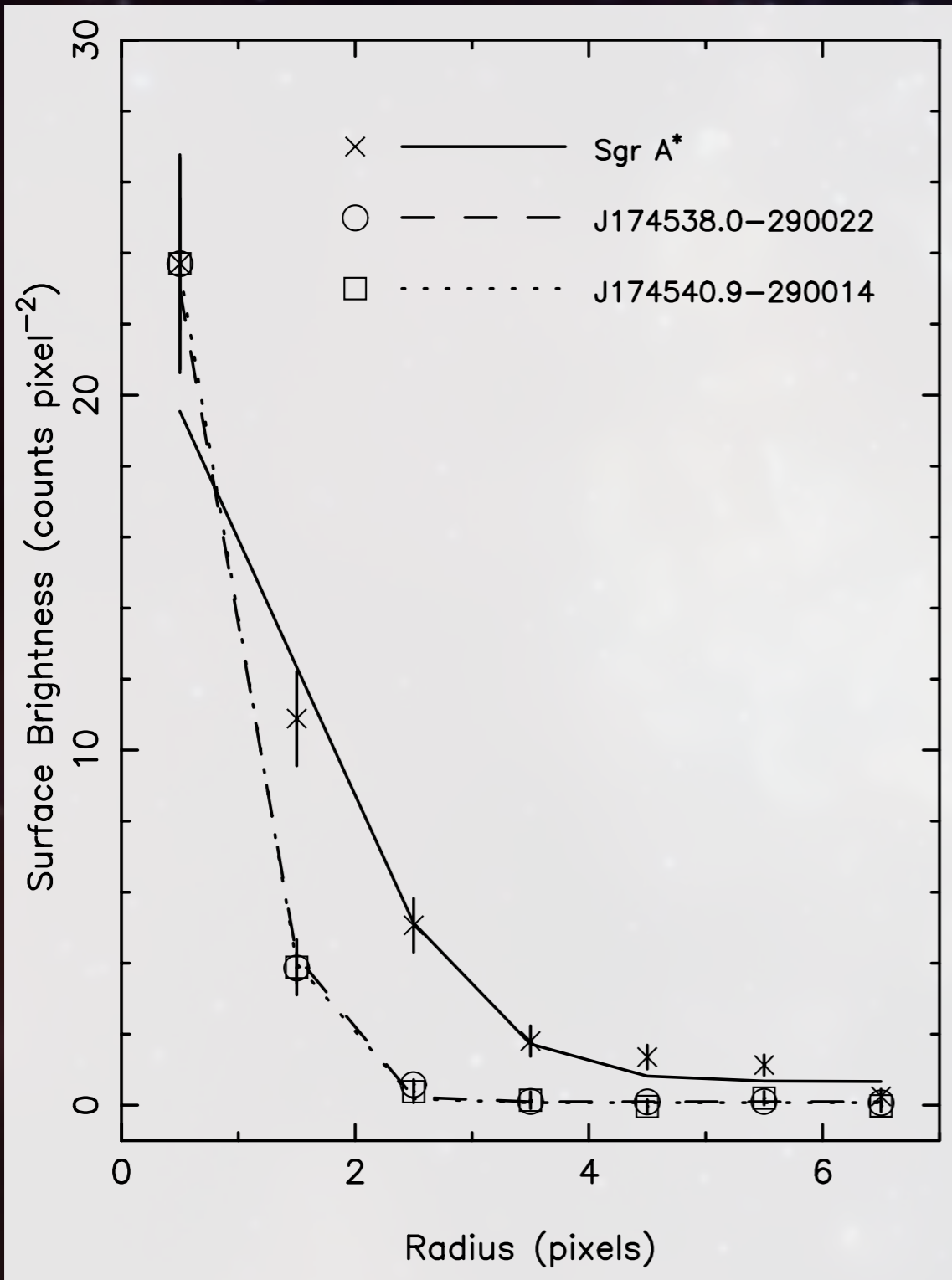


Image Credit: NASA/CXC/MIT/F.K.Baganoff

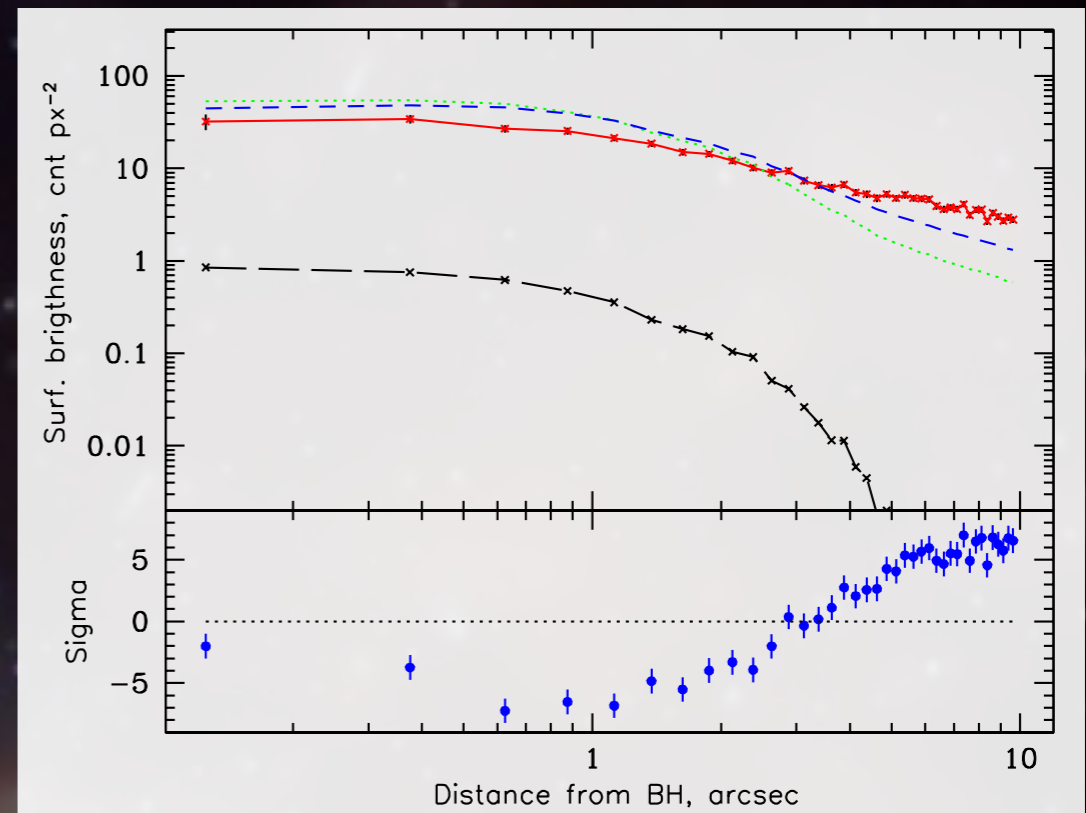




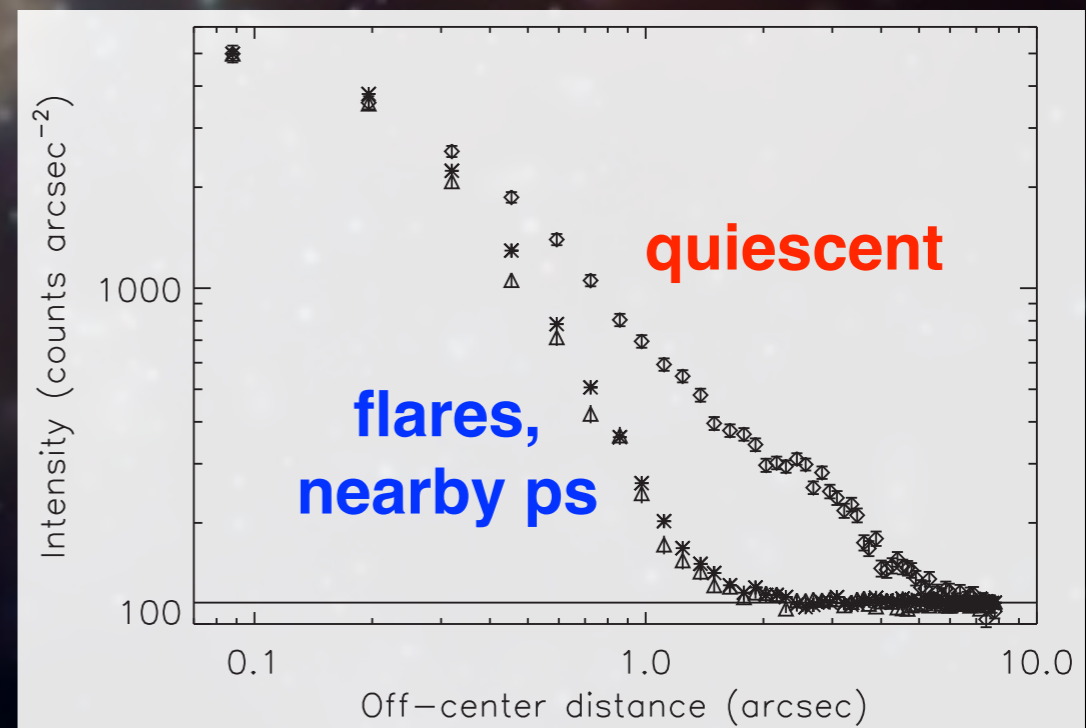
**central
parsec**



Baganoff+ 2003

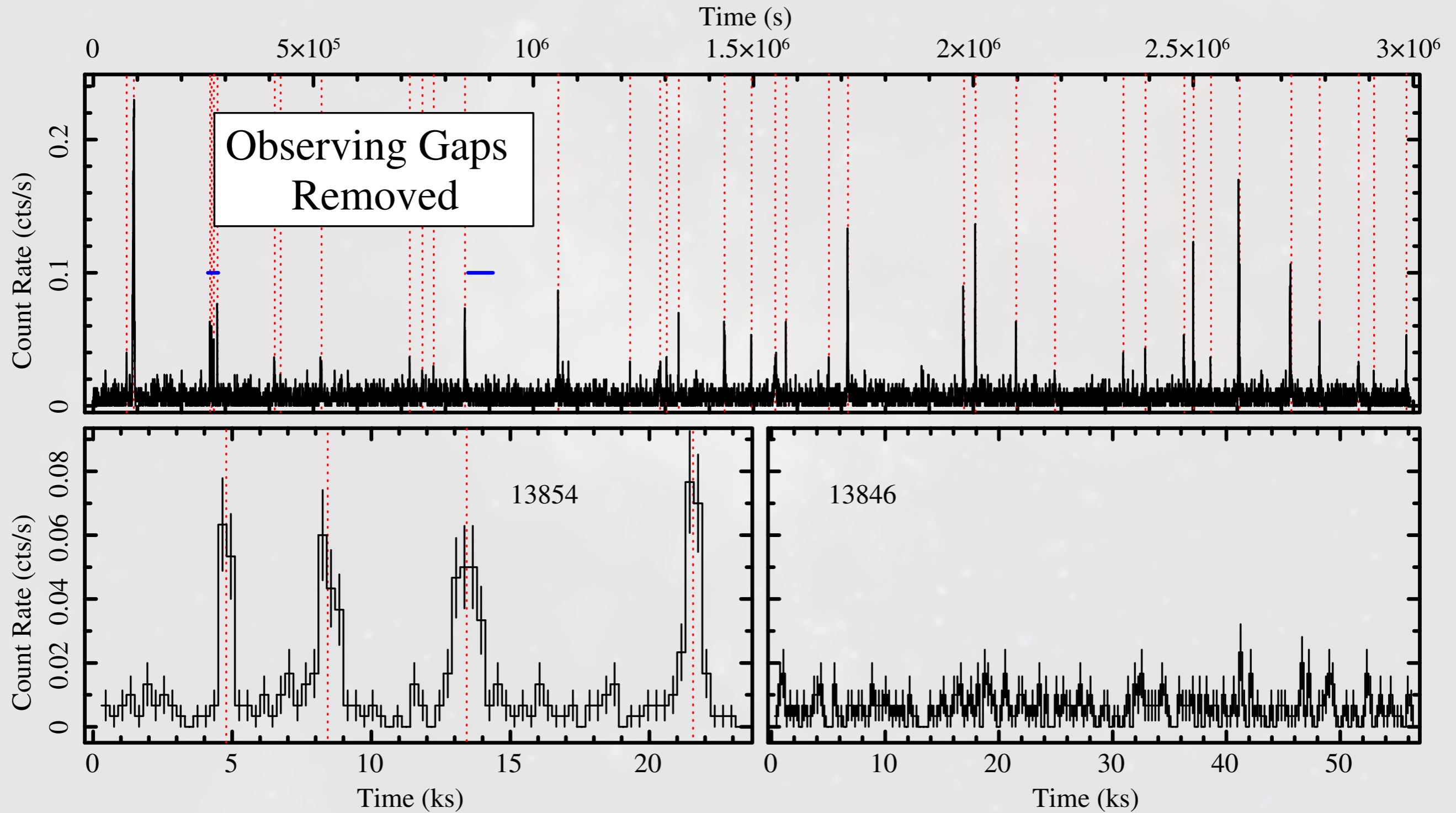


Rozanska+ 2015



Wang+ 2013

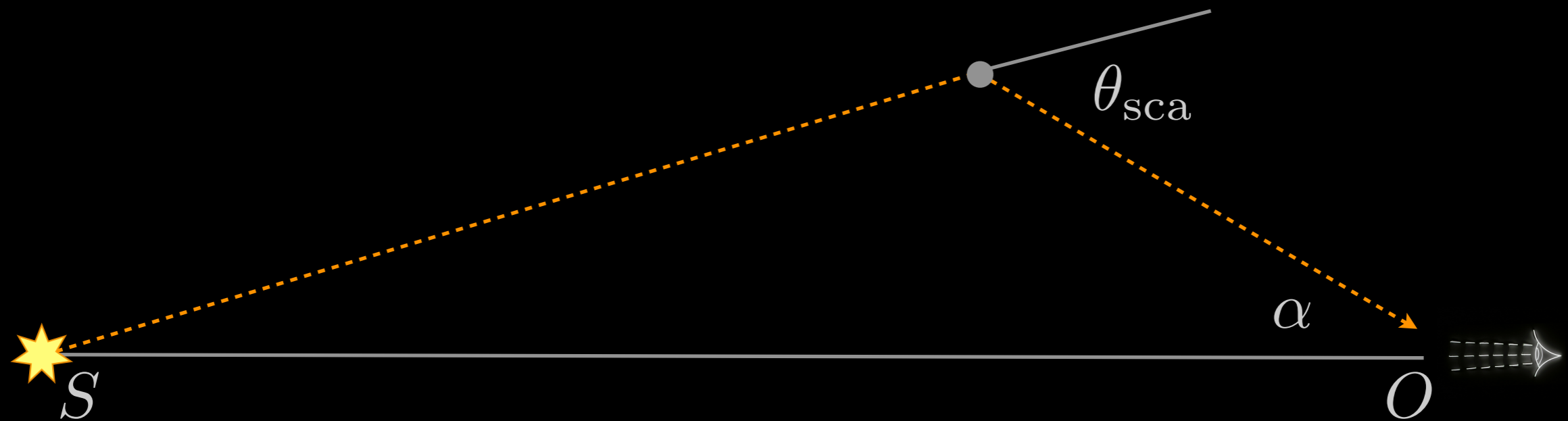
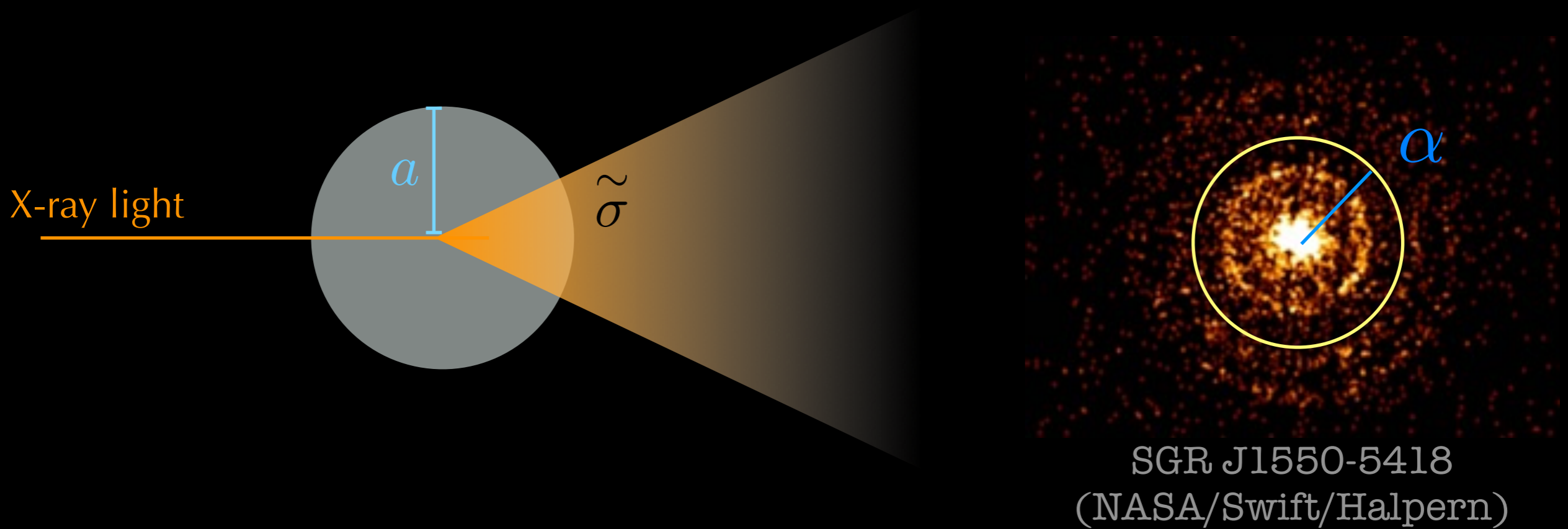
Chandra Galactic Center X-ray Visionary Project



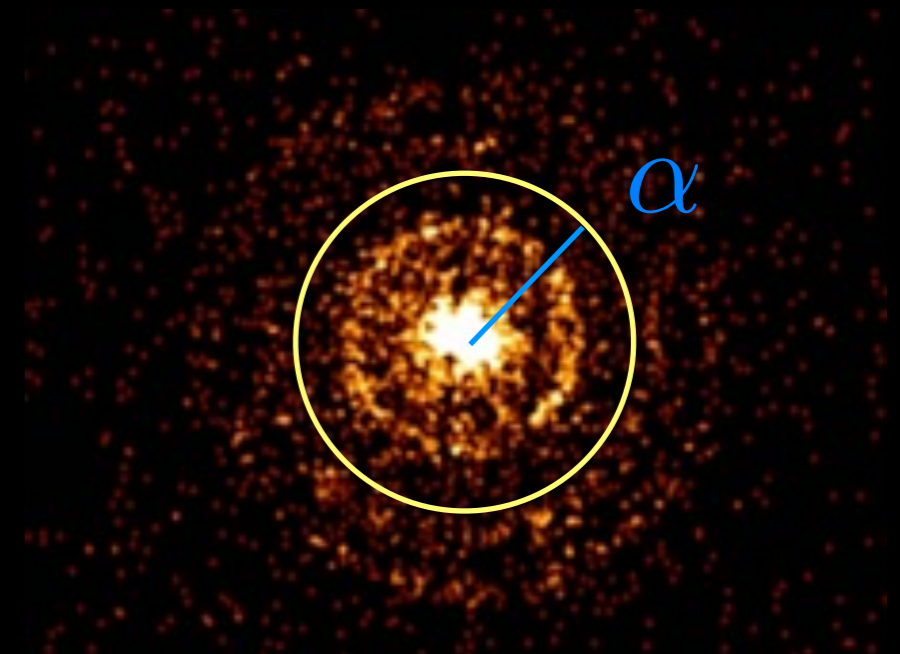
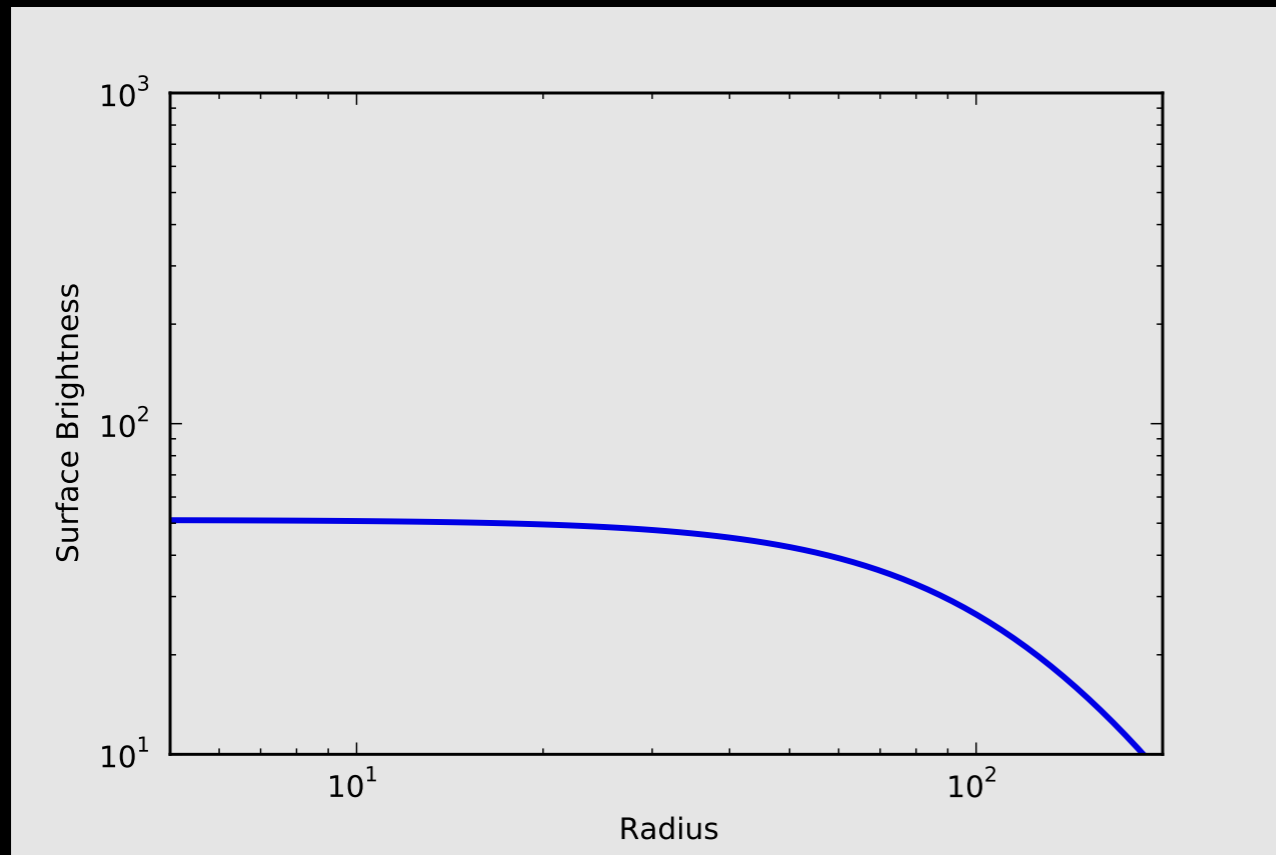
The background of the slide is a deep space image. It features a dense field of stars, with a prominent central region that is significantly brighter and more colorful. This central region has a mix of yellow, orange, and blue hues, suggesting a complex dust scattering halo or a nebula. The stars around it are mostly small, white, and blue points of light, with some fainter, reddish stars scattered throughout. The overall appearance is that of a rich star-forming region or a cluster of stars with associated interstellar dust.

Information in dust scattering halos

X-ray scattering is a diagnostic tool for ISM structure

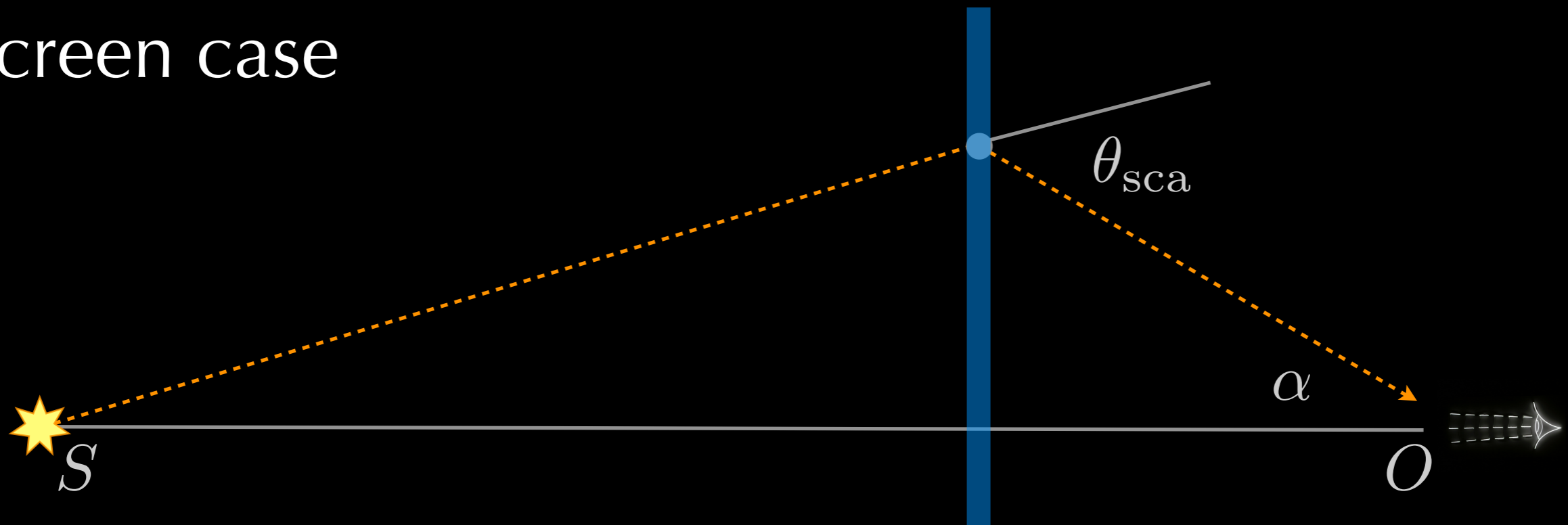


X-ray scattering is a diagnostic tool for ISM structure

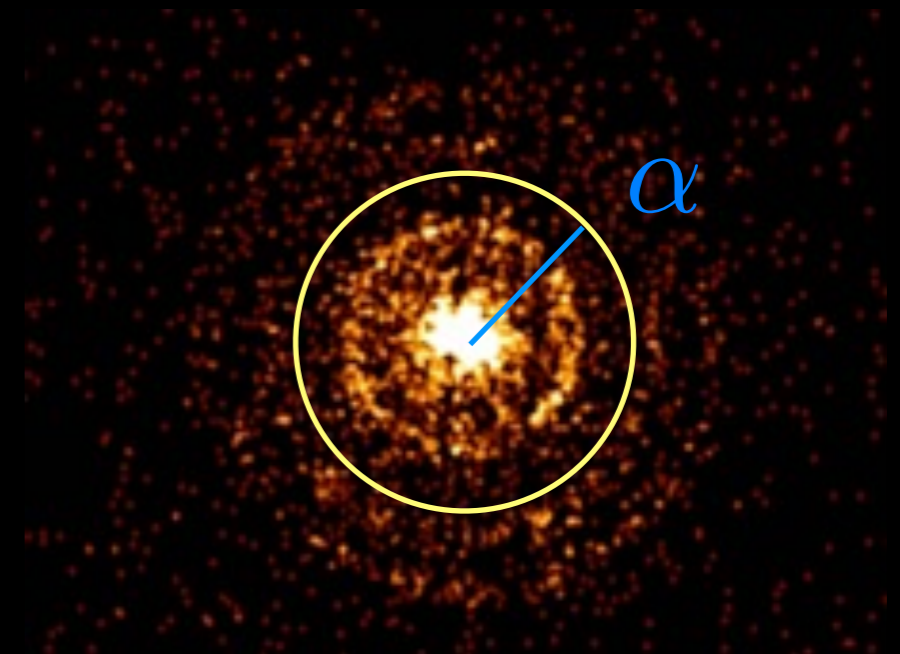
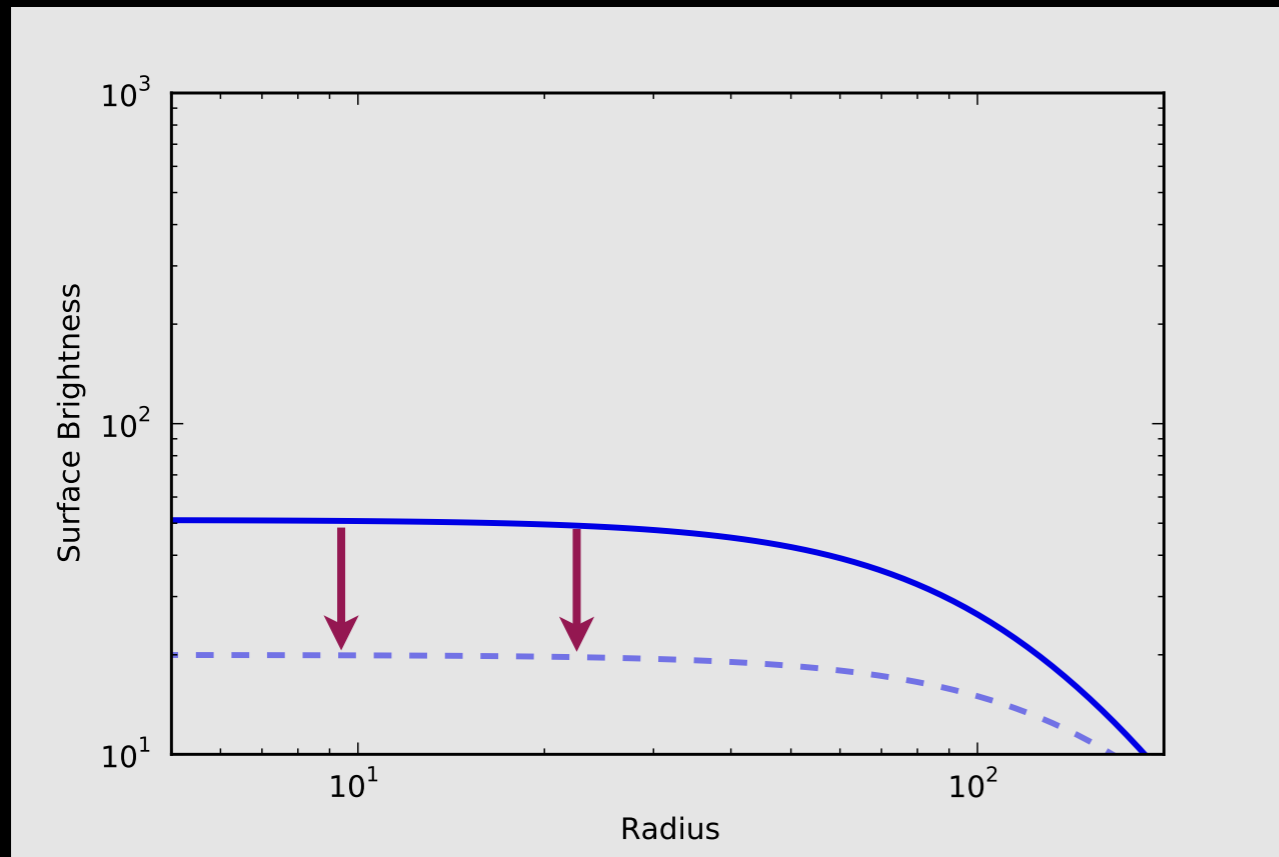


SGR J1550-5418
(NASA/Swift/Halpern)

Screen case

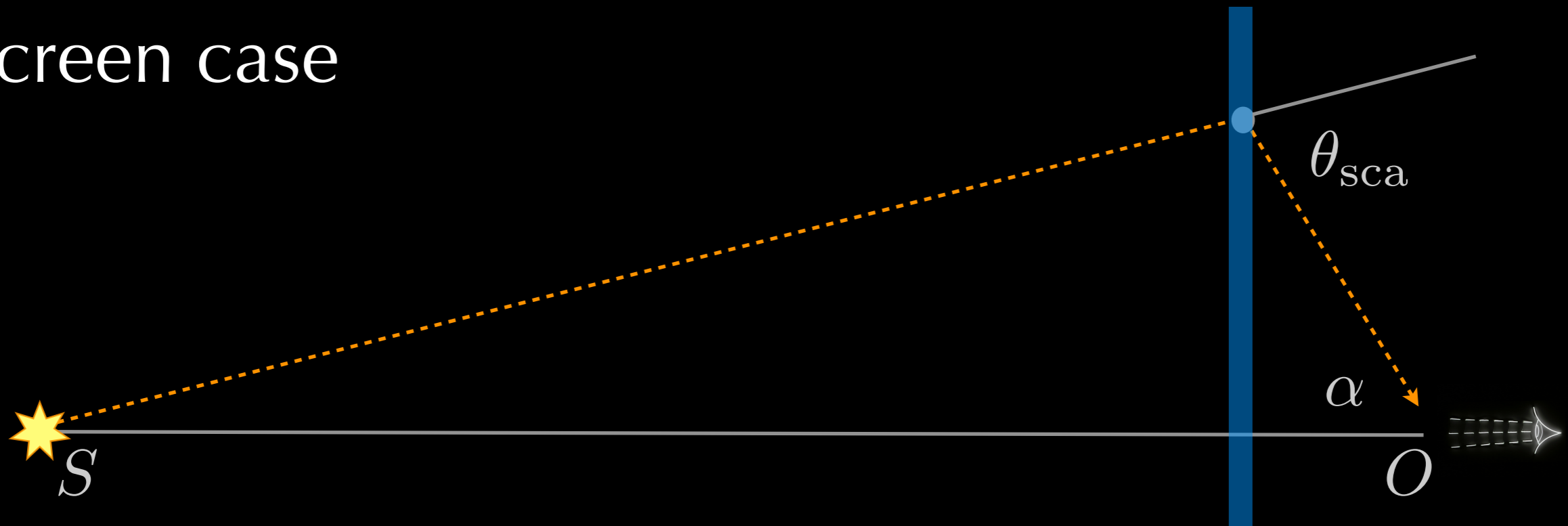


X-ray scattering is a diagnostic tool for ISM structure

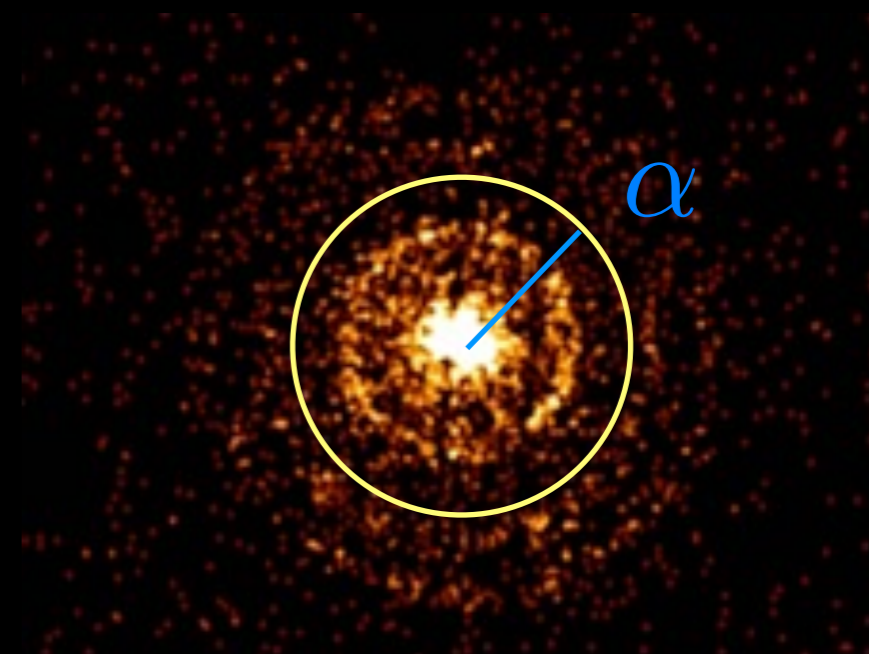
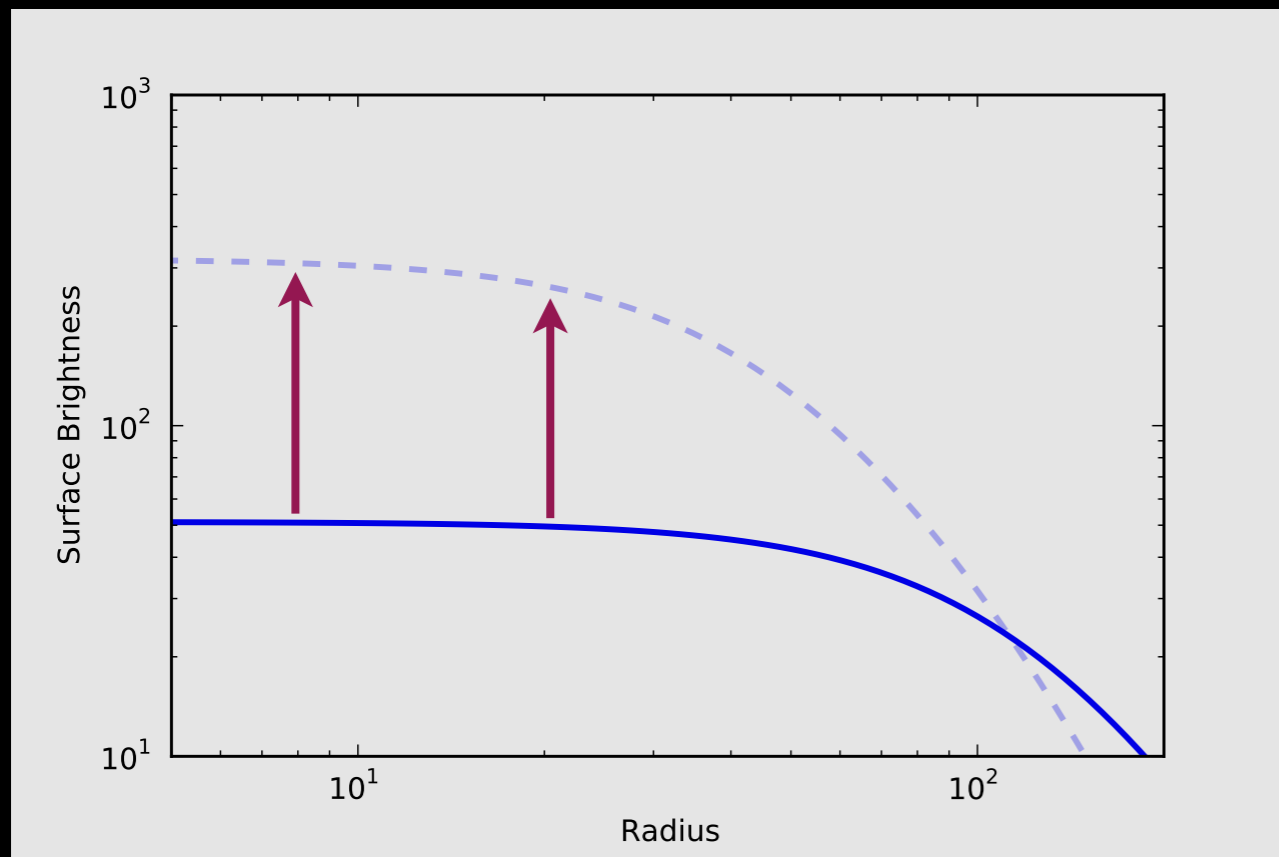


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Screen case

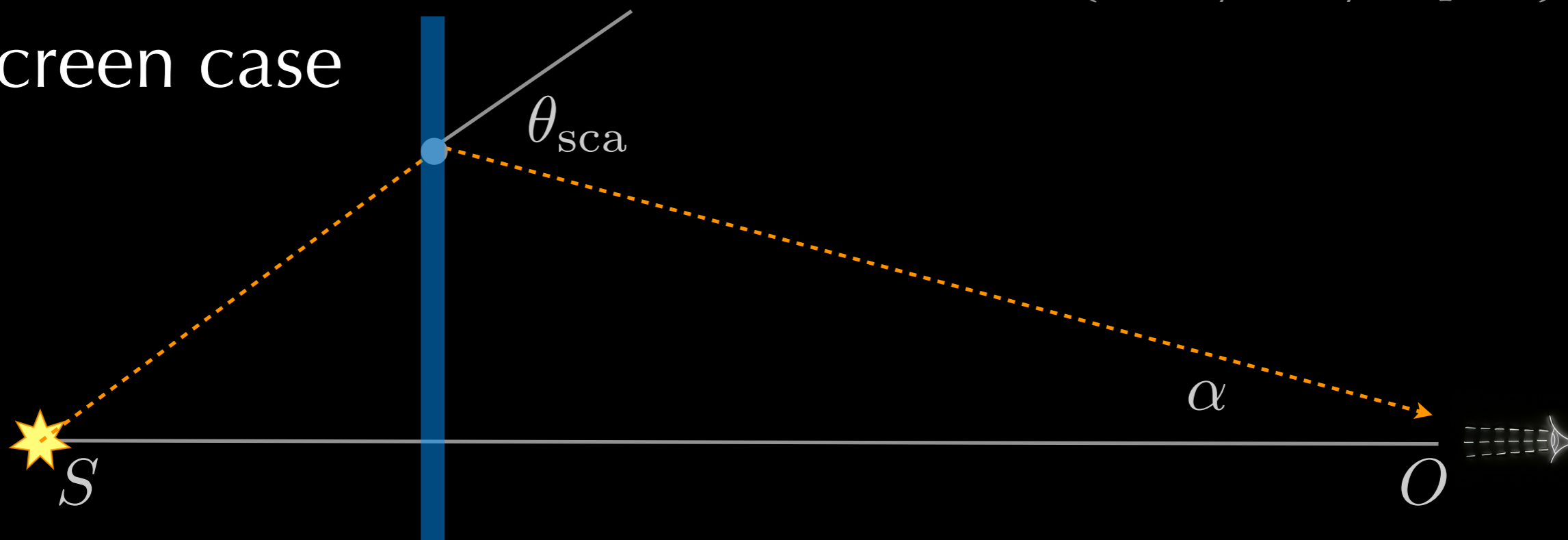


X-ray scattering is a diagnostic tool for ISM structure

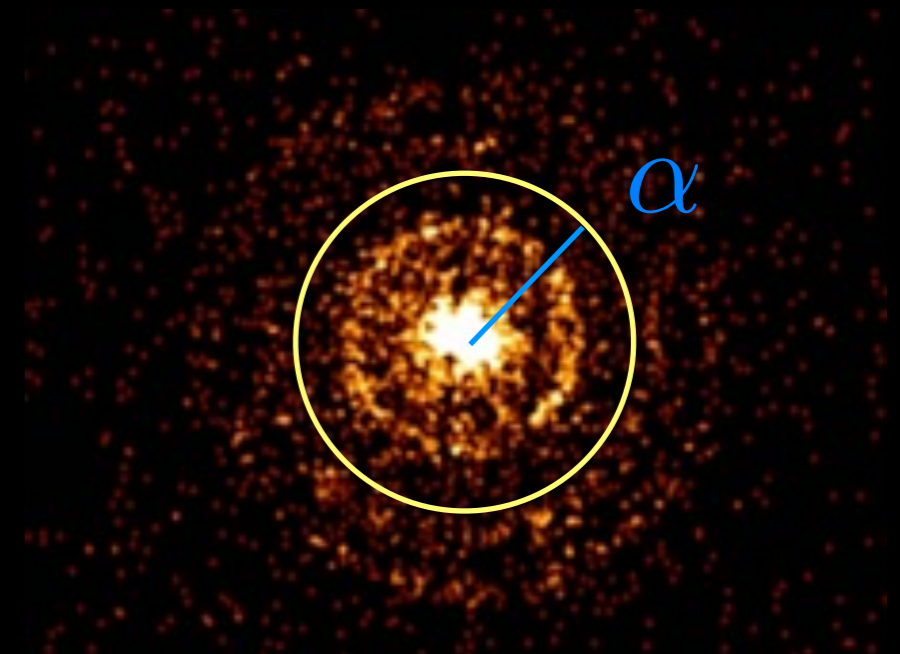
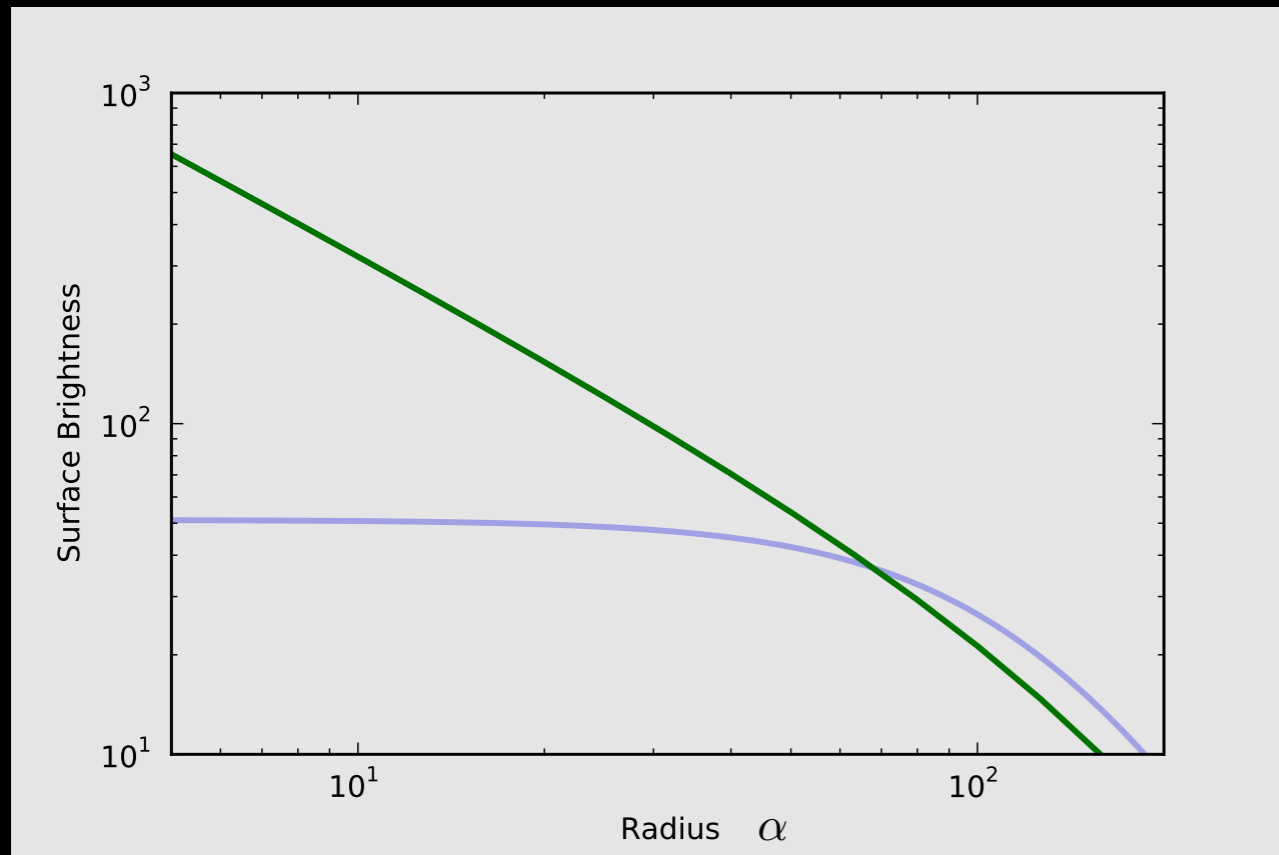


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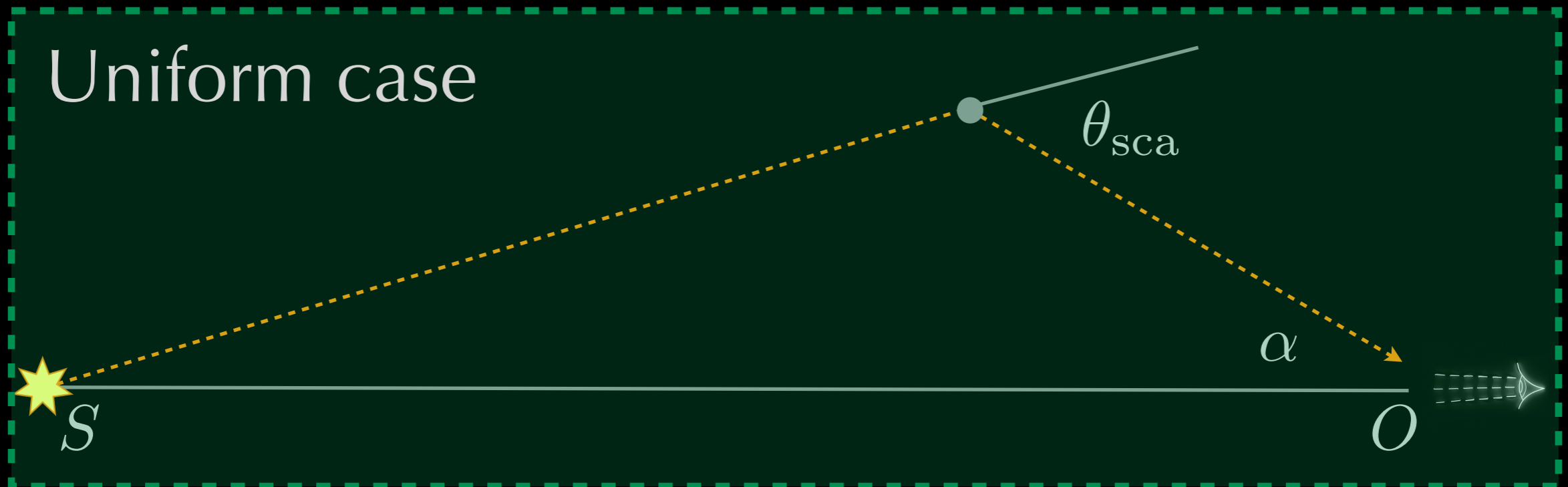
Screen case




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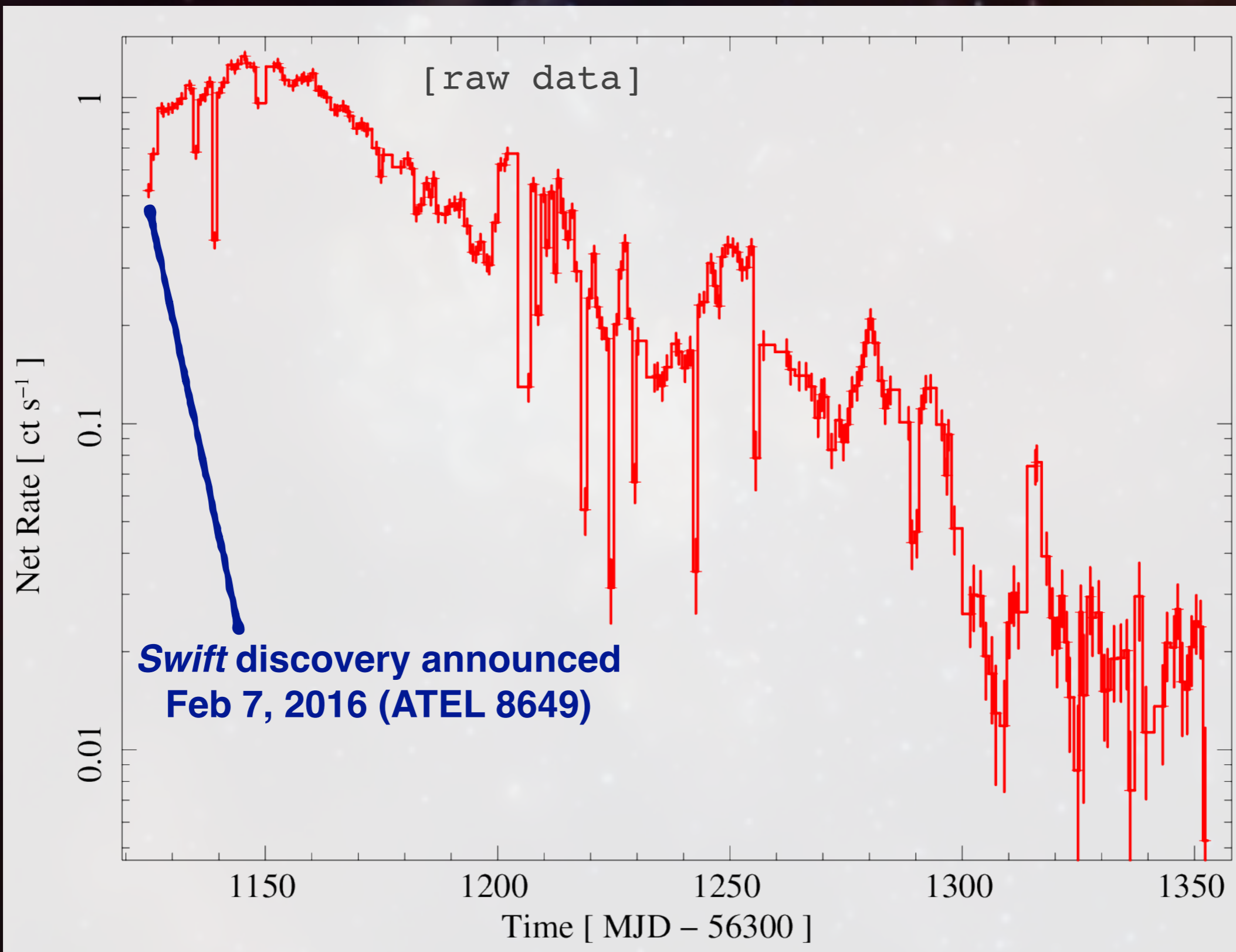


Use **X-ray transients** in the Galactic Center
to **map foreground dust structure** affecting X-ray images
so we can **apply this knowledge to Sgr A***

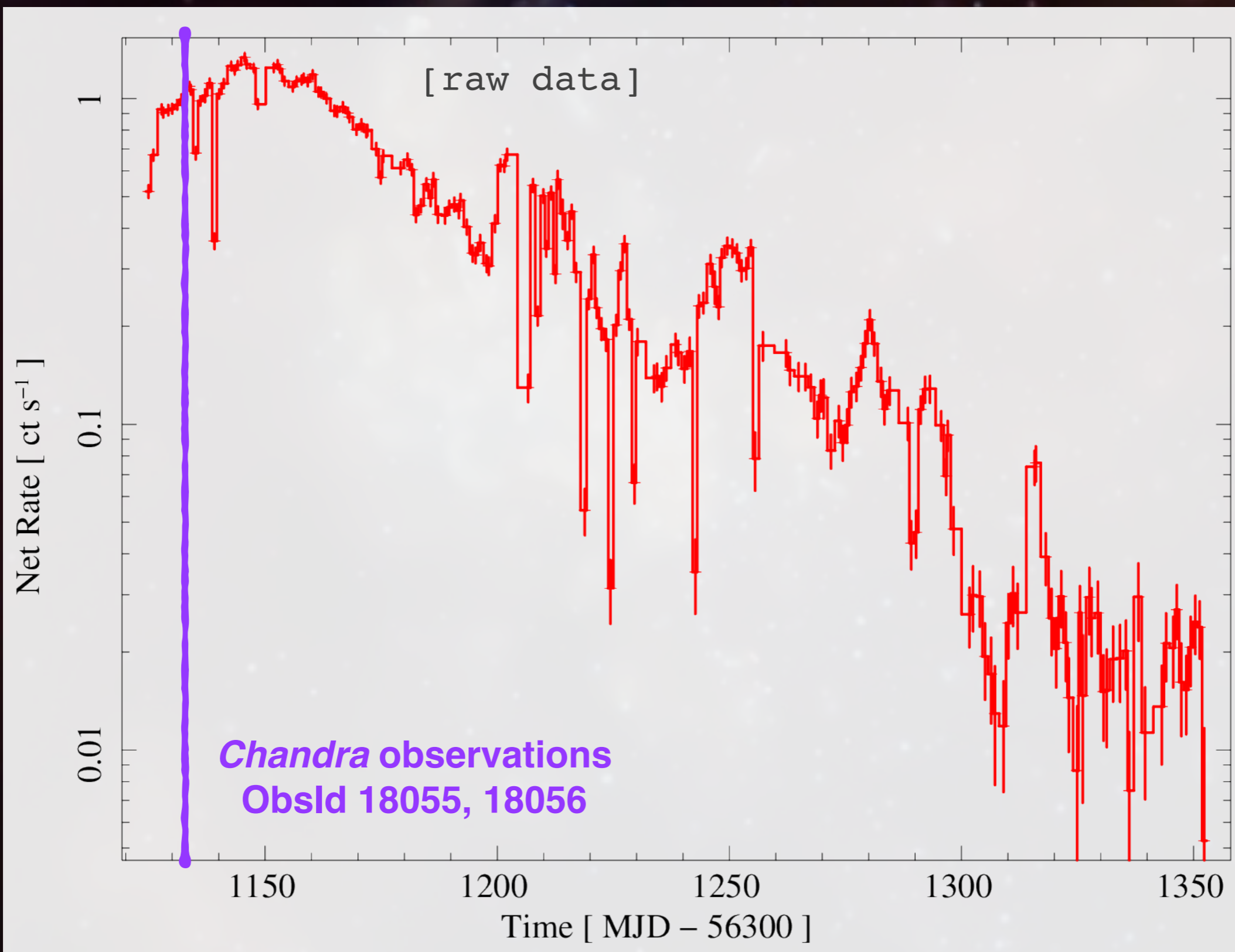


Swift J174540.7-290015

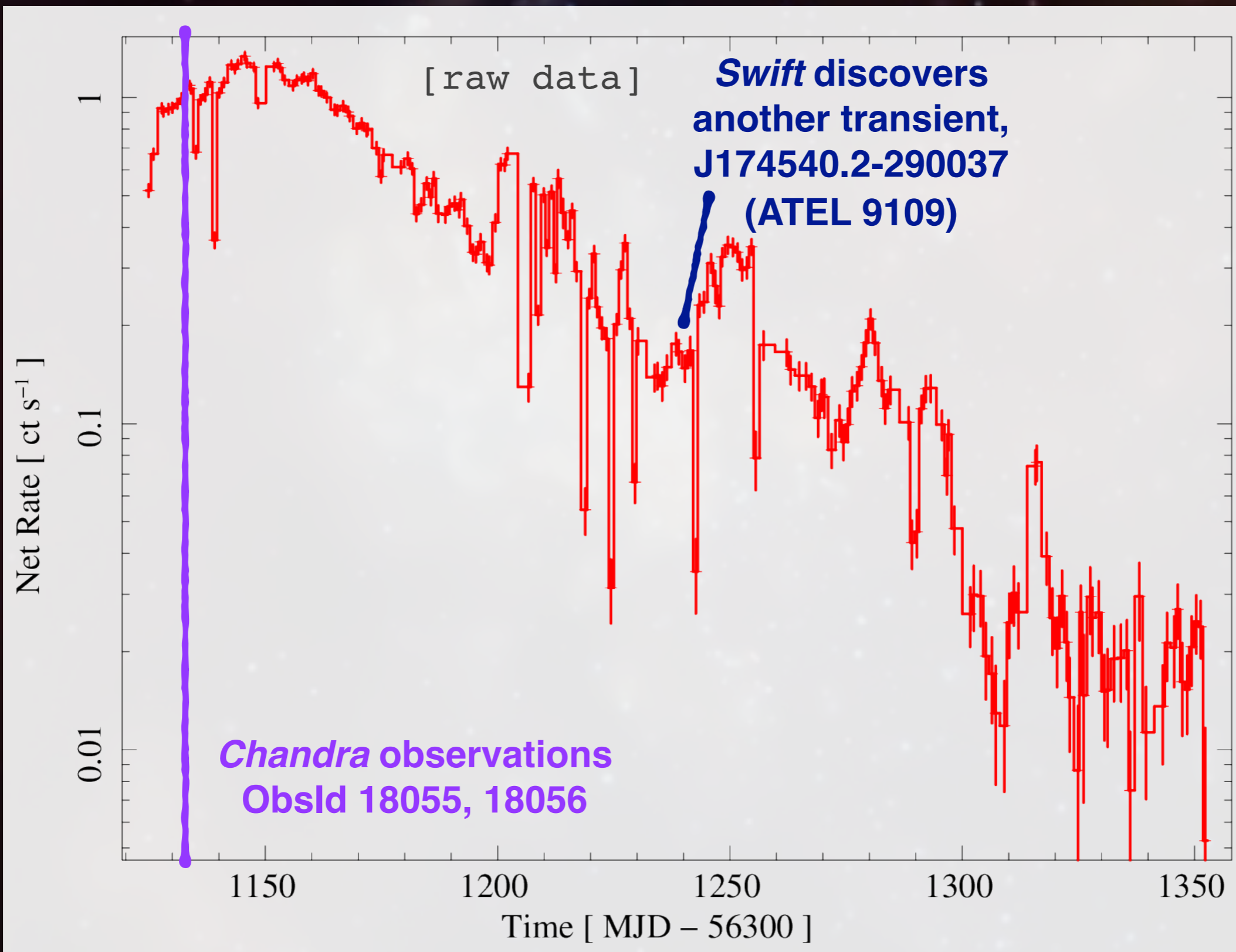
Swift Galactic Center monitoring campaign



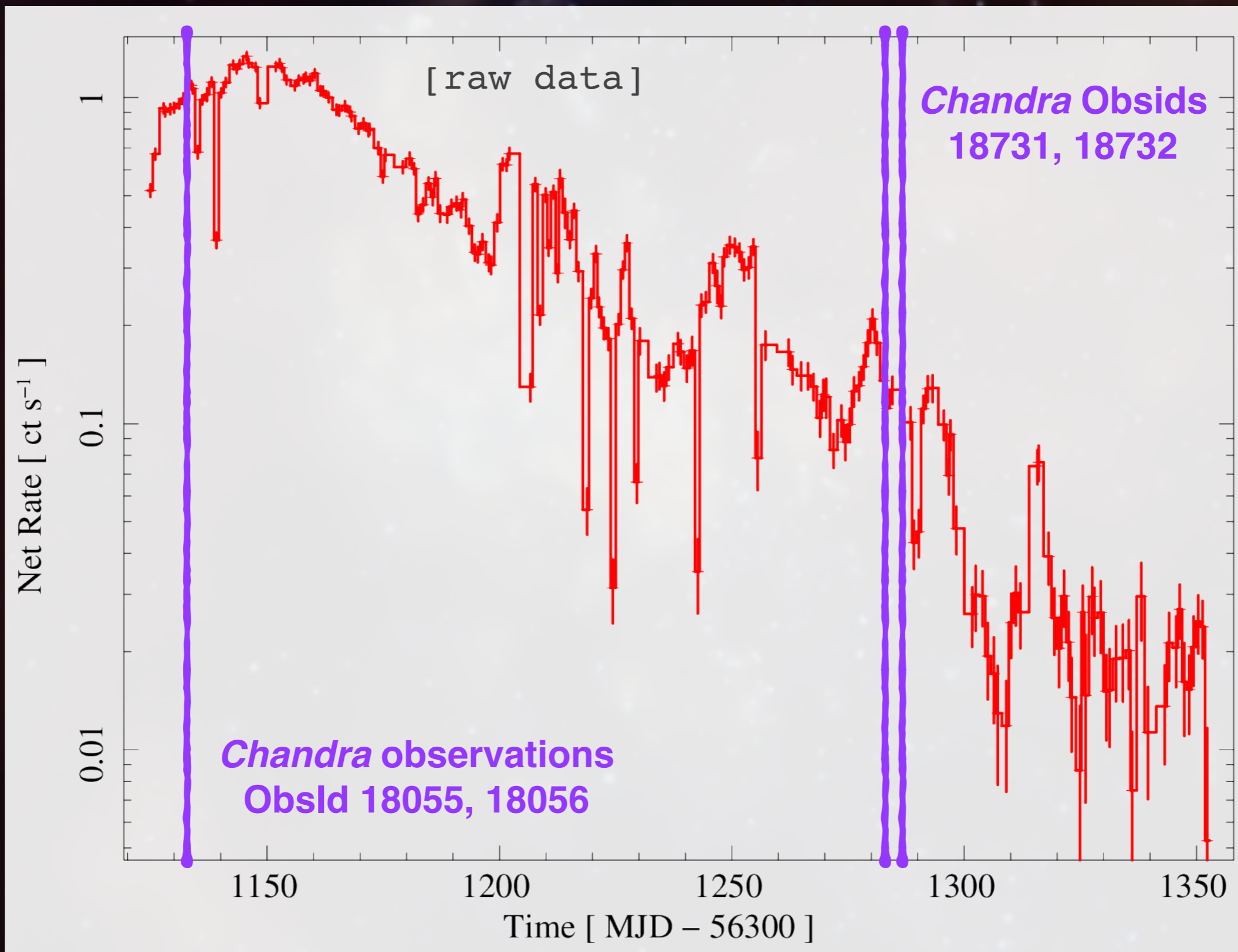
Swift Galactic Center monitoring campaign



Swift Galactic Center monitoring campaign

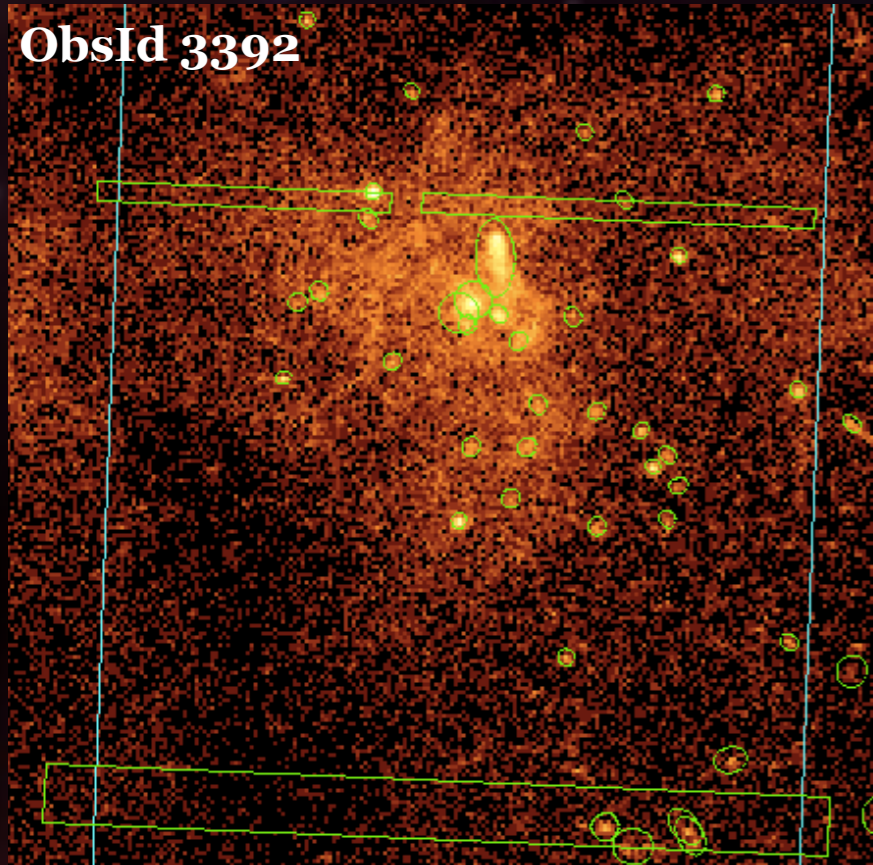


Swift Galactic Center monitoring campaign

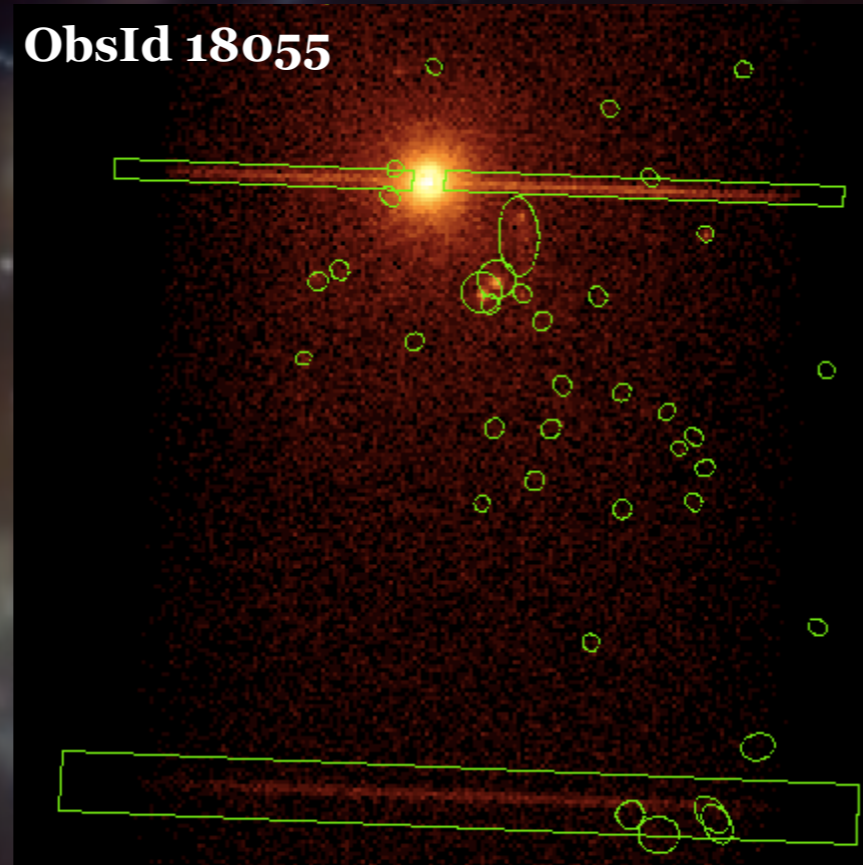




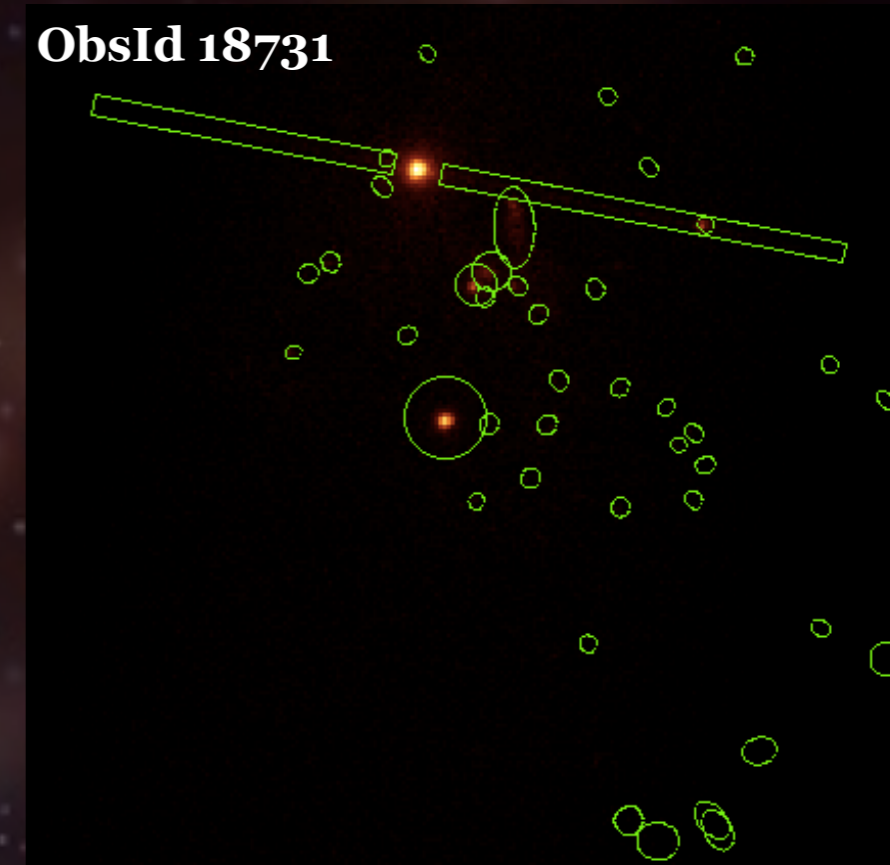
Search for dust scattering



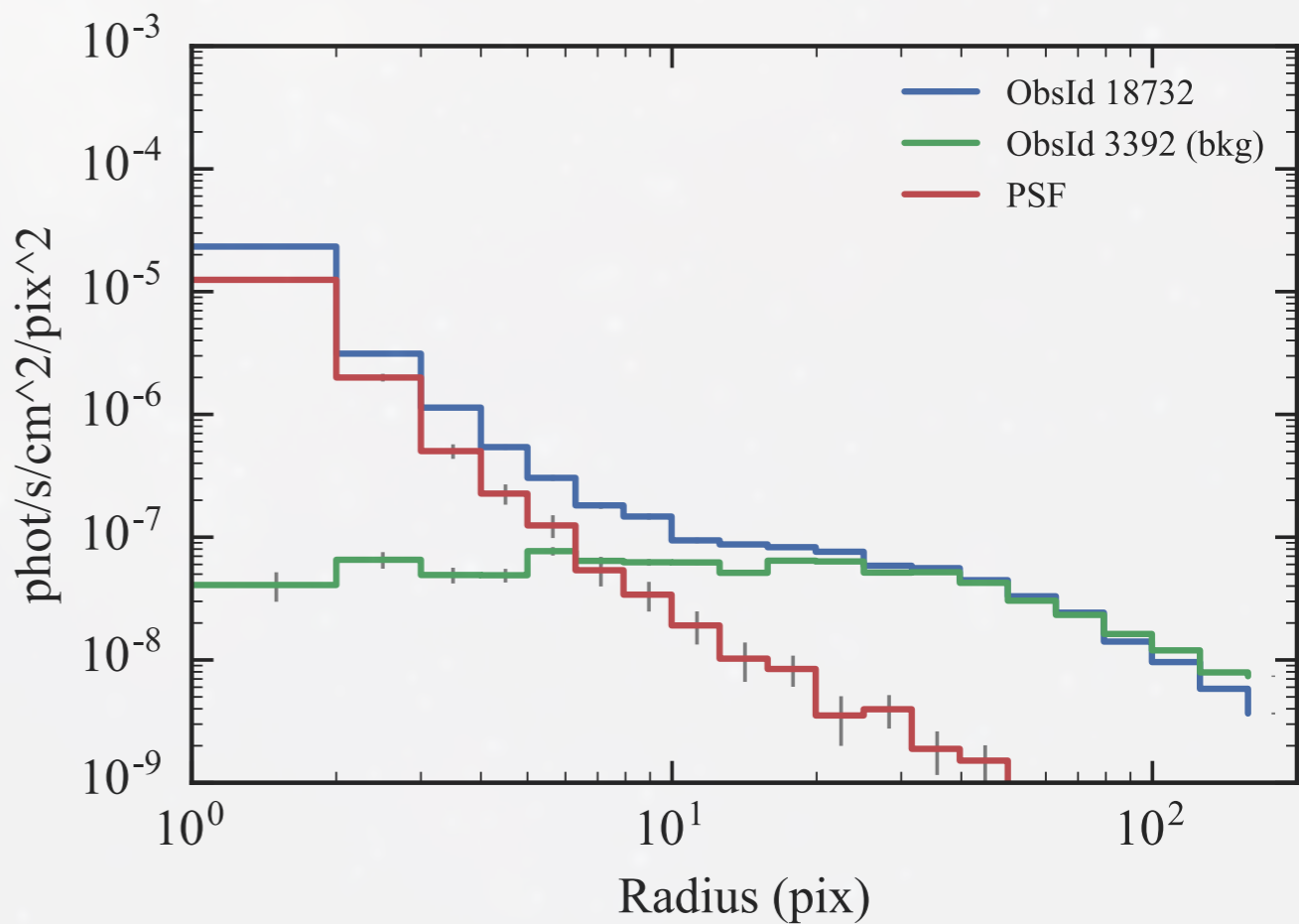
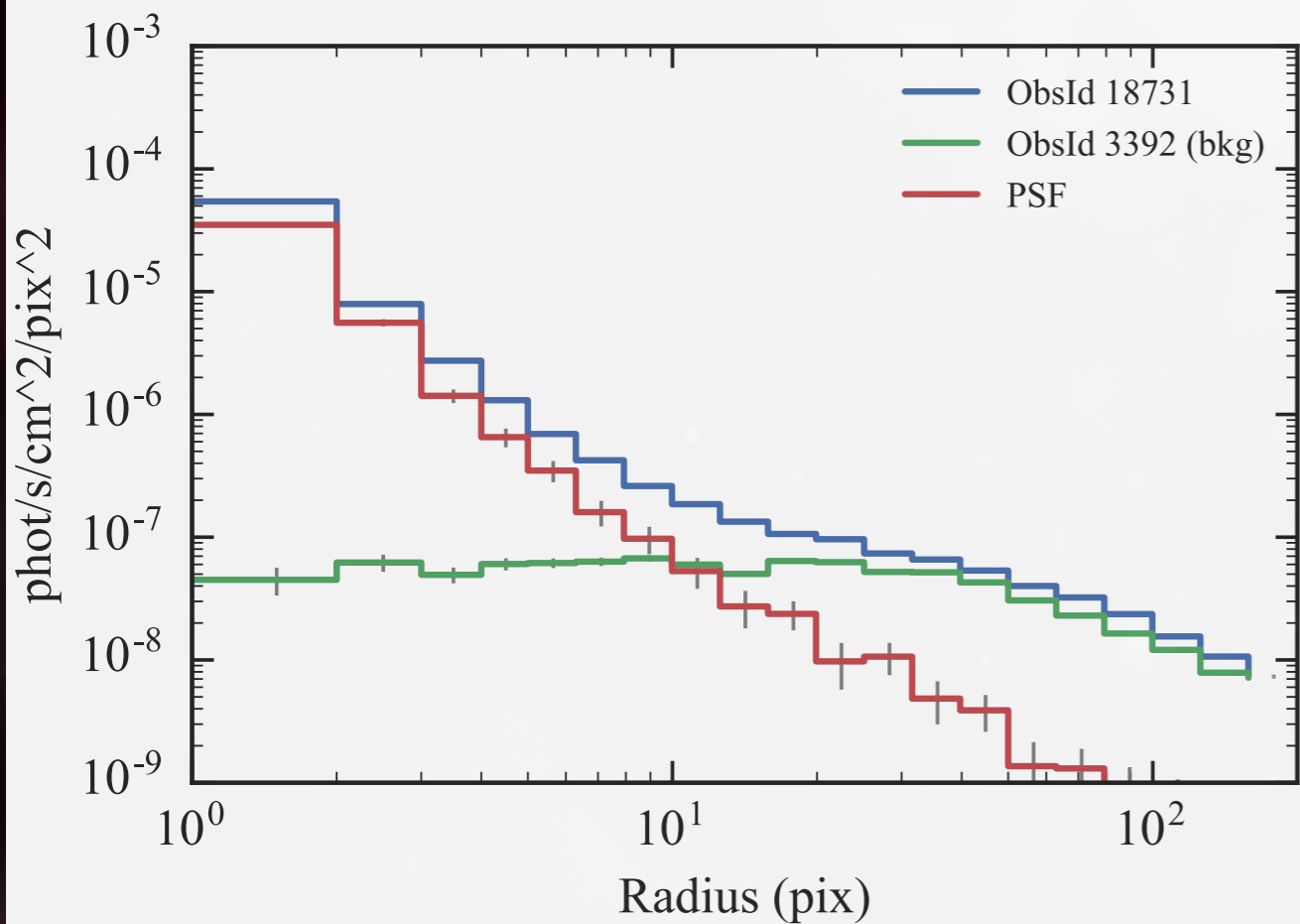
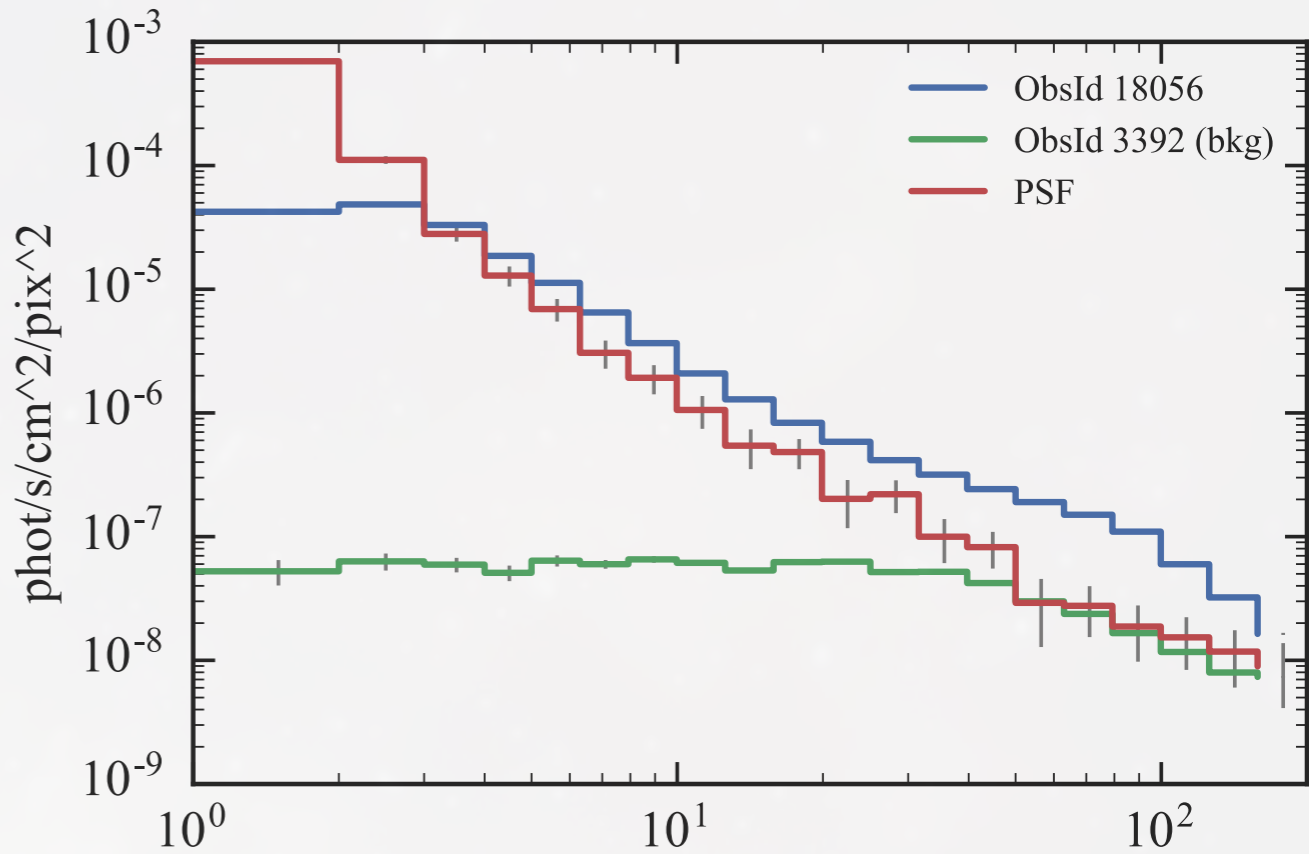
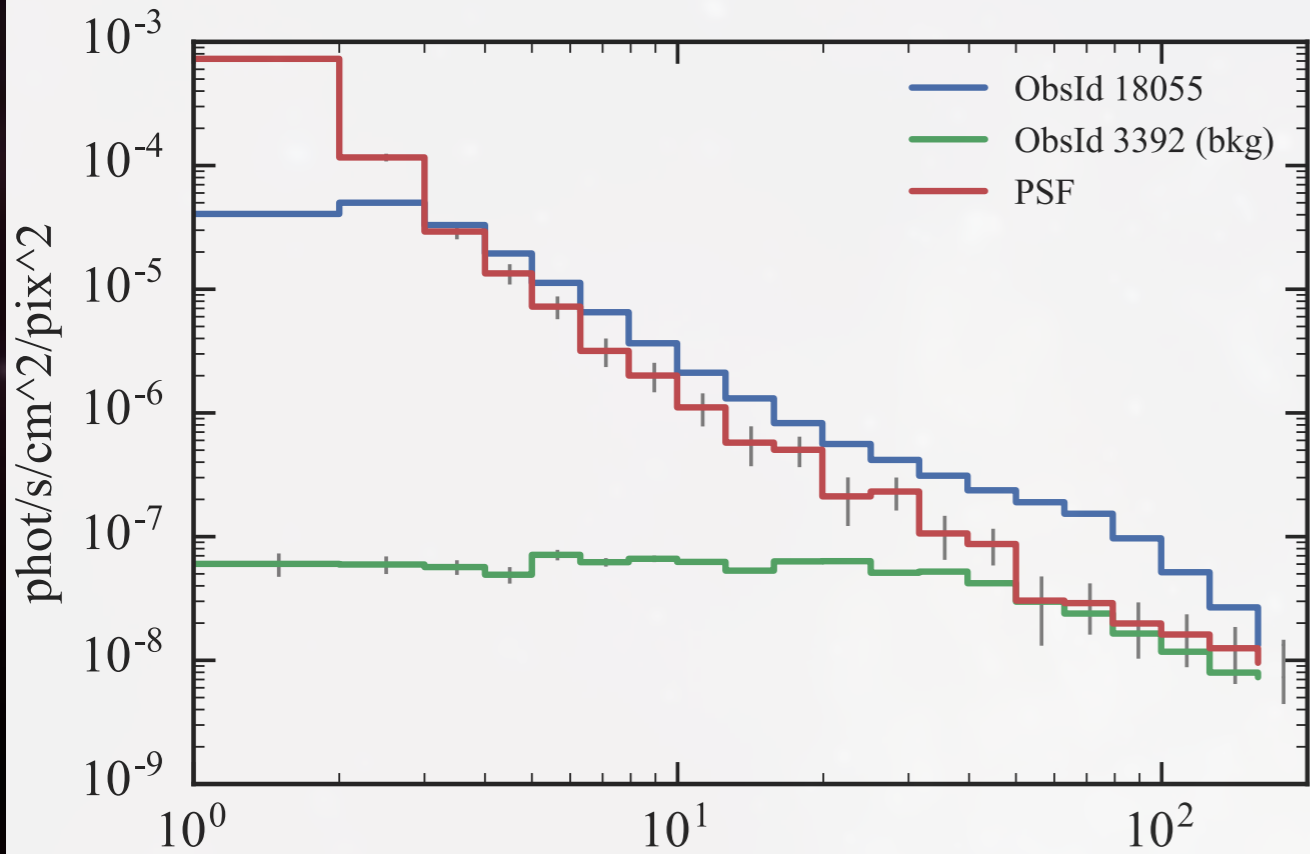
background

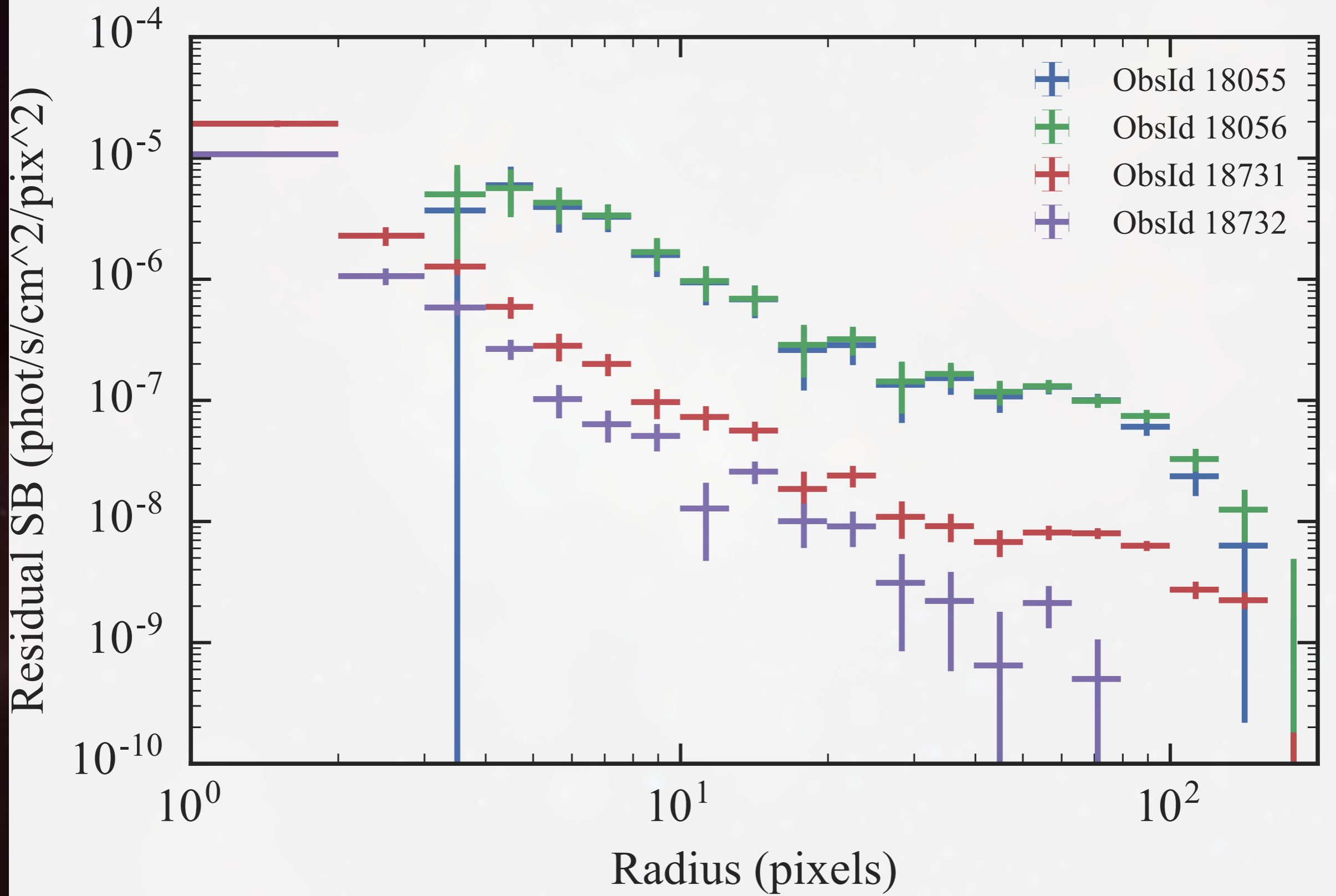


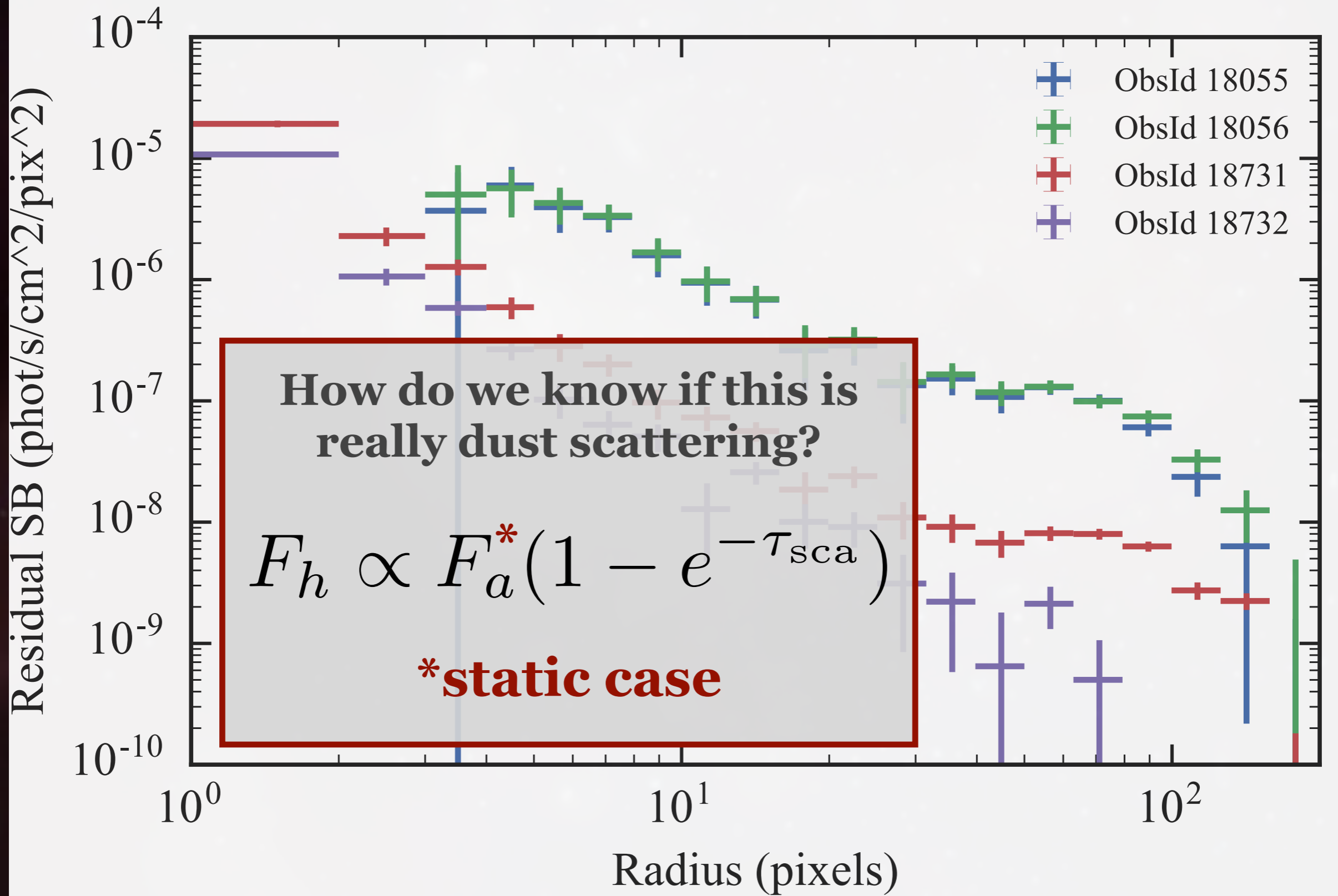
J174540.7-290015 profiles

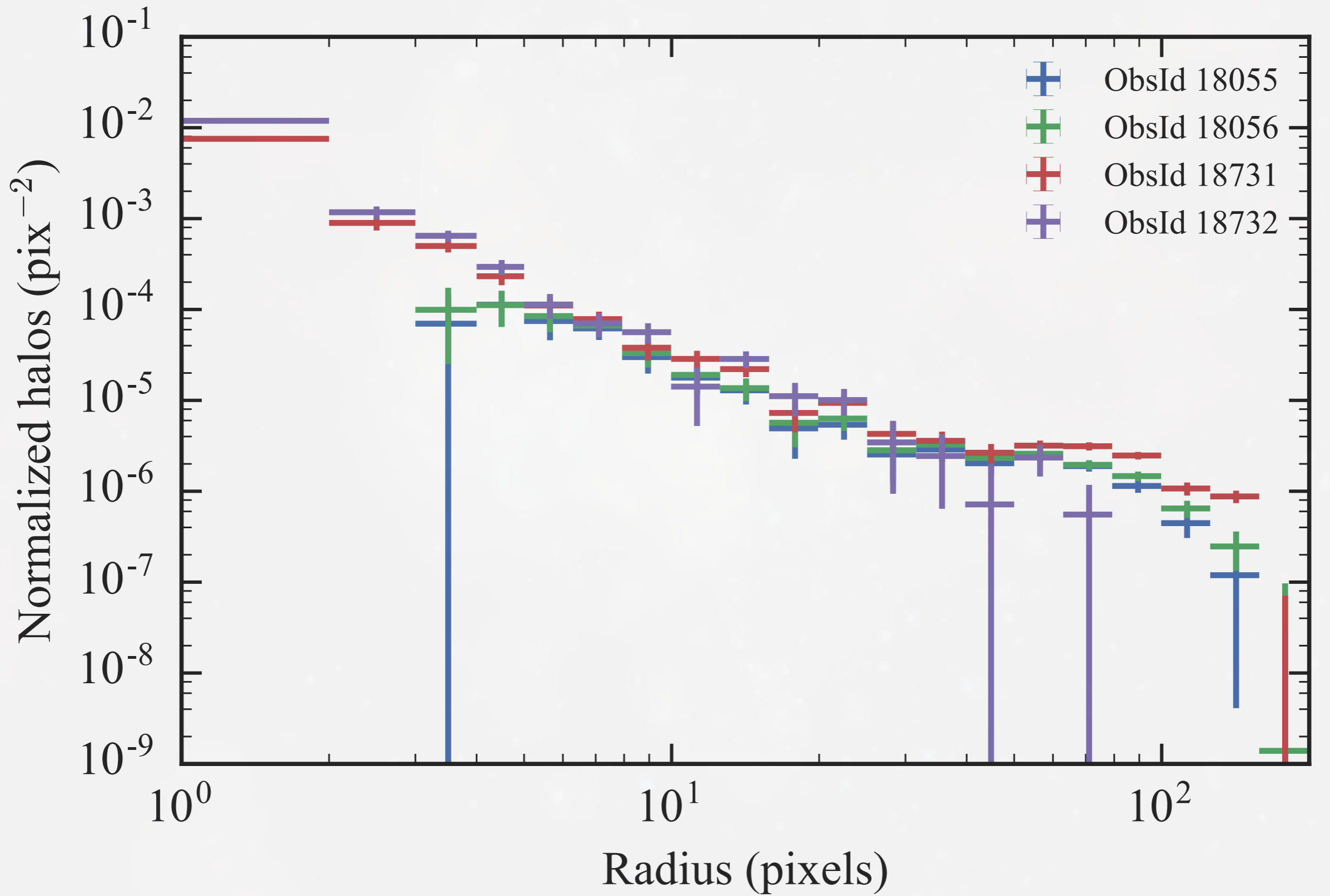


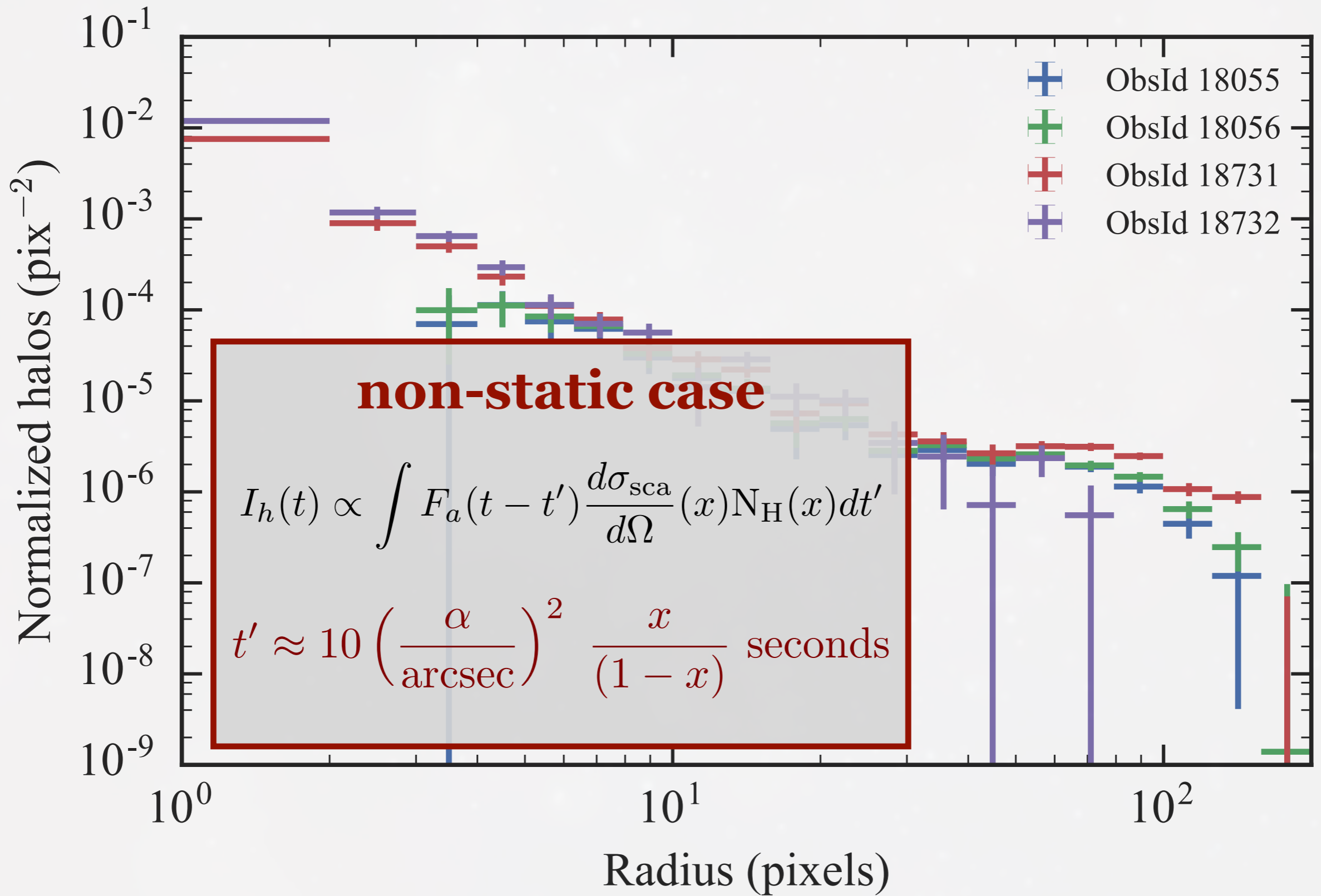
**PSF constructed with
a low-NH source as template
(QSO B1028+511)**

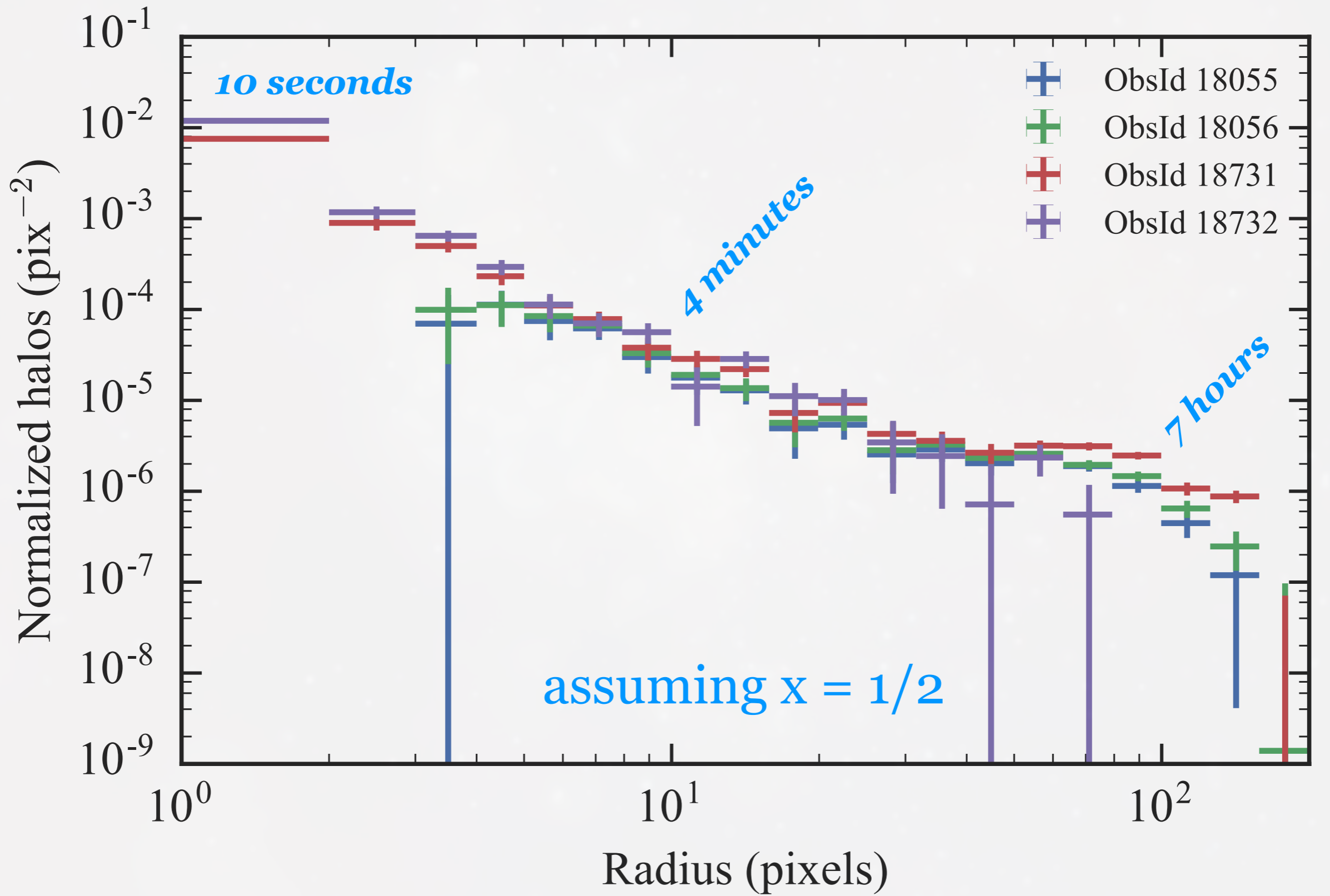








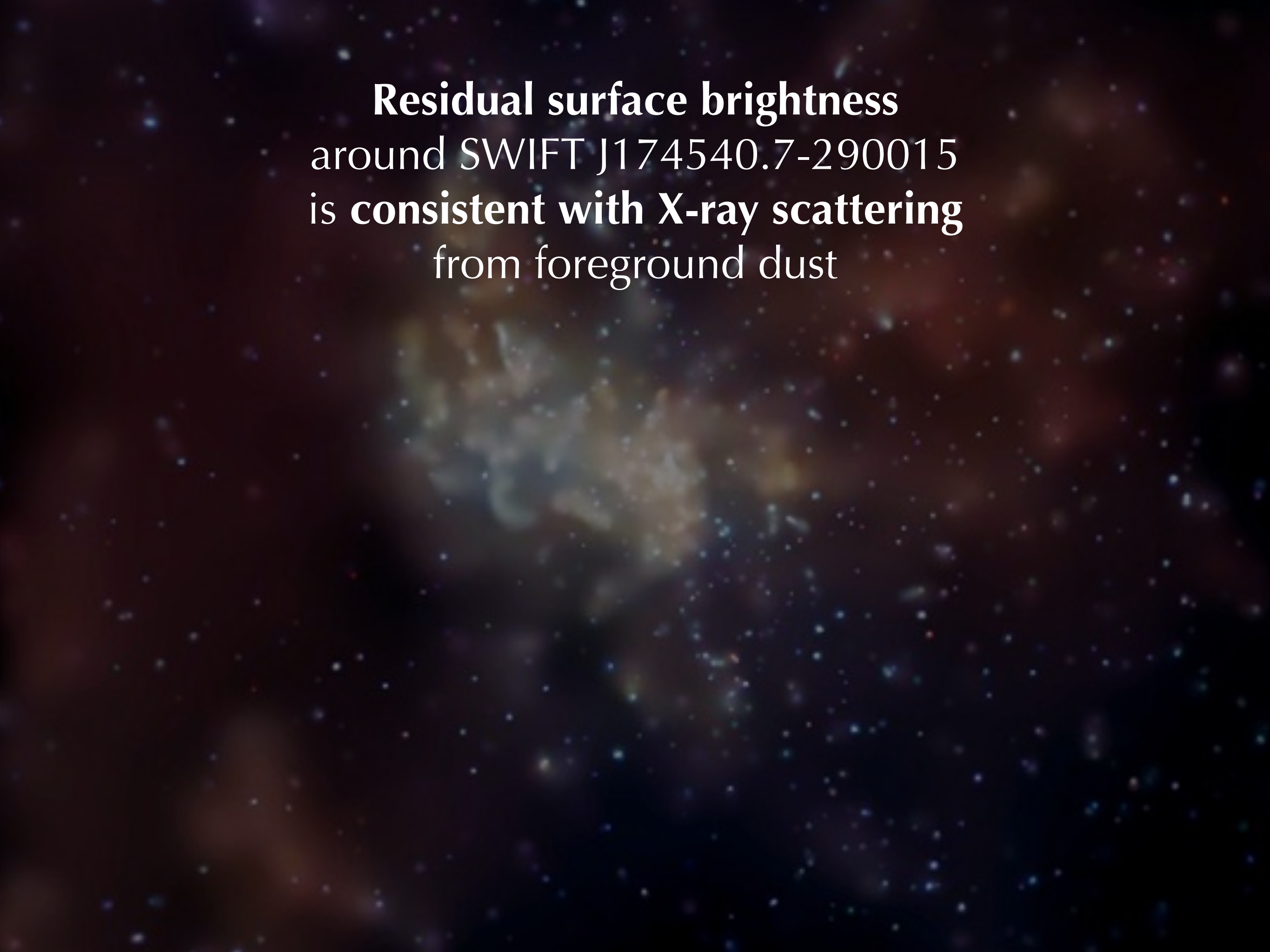






Summary

Residual surface brightness
around SWIFT J174540.7-290015
is **consistent with X-ray scattering**
from foreground dust

The background of the slide is a deep-field astronomical image showing a vast field of stars. The stars are concentrated in a central, brighter region, likely the core of a star-forming region or a galaxy. The colors of the stars vary, with many appearing blue and some appearing redder. The overall appearance is that of a dense stellar population.

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Go into the **time domain**
to pin down **locations** of foreground dust

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Compare to **radio** and **infrared** datasets

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Apply dust scattering effects to **Sgr A***

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Thank you