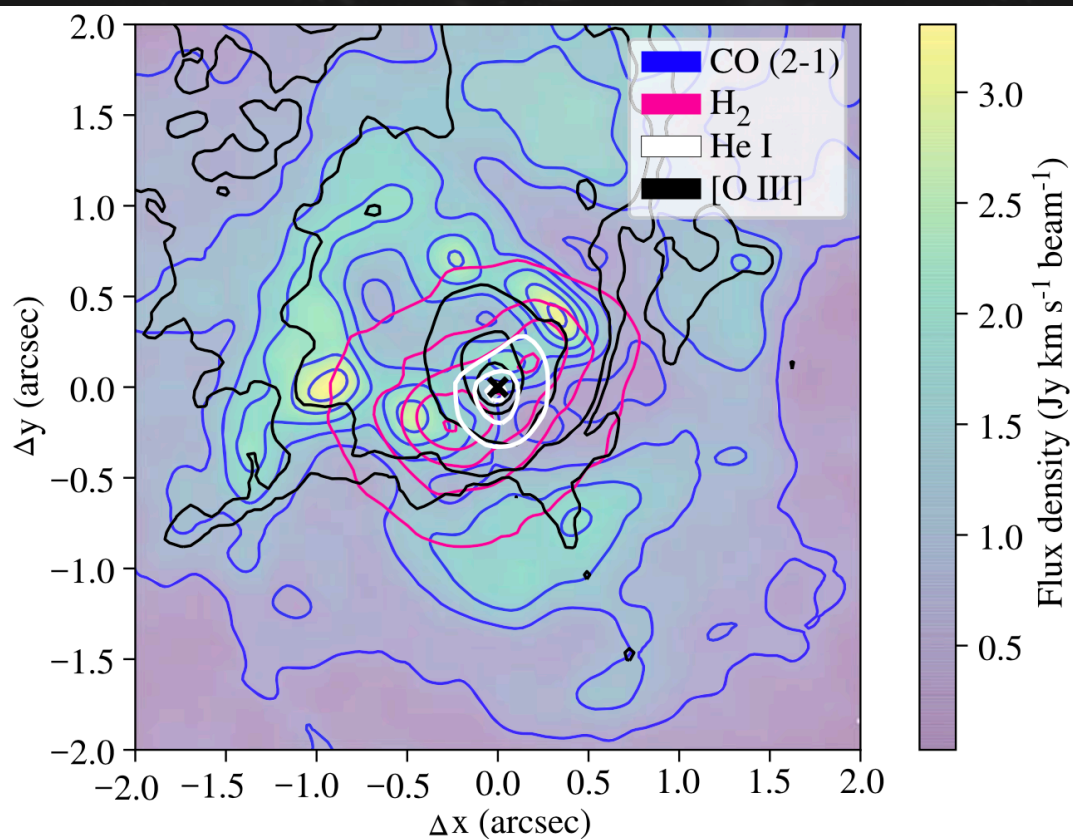


Resolving the AGN-Driven Gas Evacuation in the Seyfert 1 Galaxy NGC 3227

Julia Falcone
PhD Candidate, Georgia State University

Observation of Multiphase Outflows



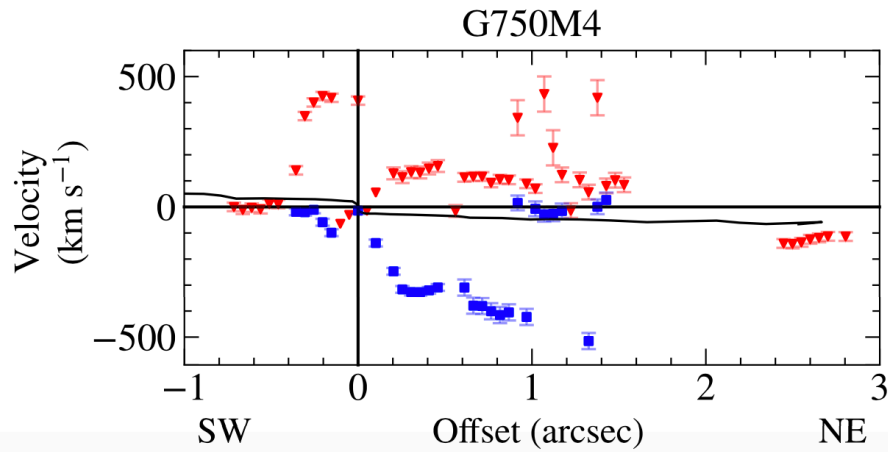
We observe multiphase outflows in:

Cold molecular CO (2-1)

Warm molecular H₂

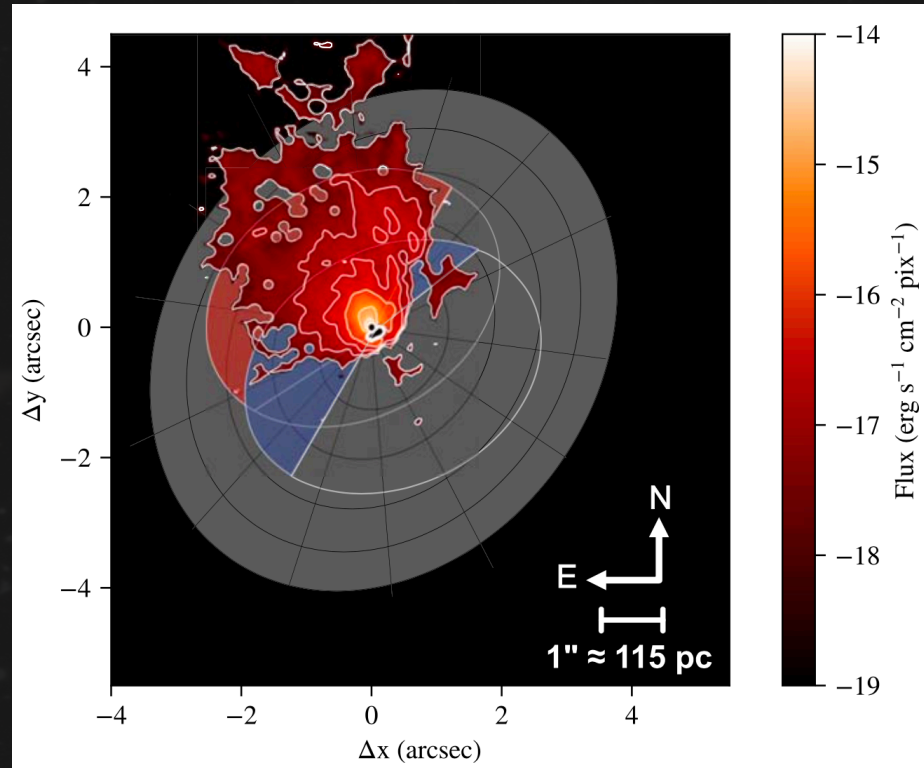
Ionized [O III]

Orientation of the Outflows



We use spectroscopy to better understand the gas kinematics.

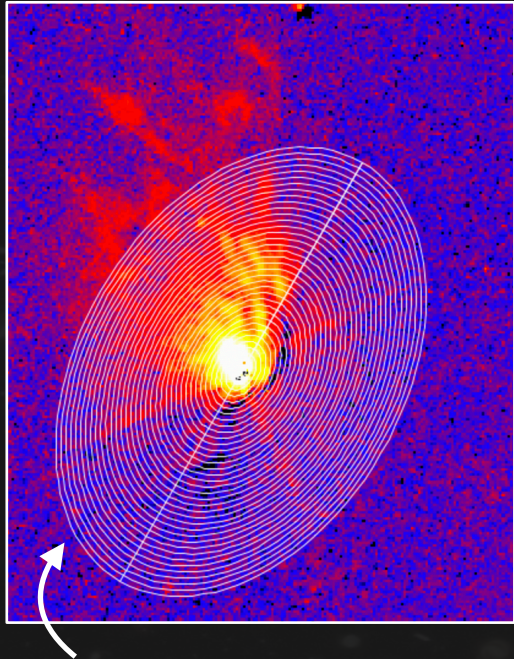
We use this information to determine an orientation for the outflowing material.



Falcone+ (2024)

Calculating Mass Outflow Rates

Ionized gas
[O III] emission

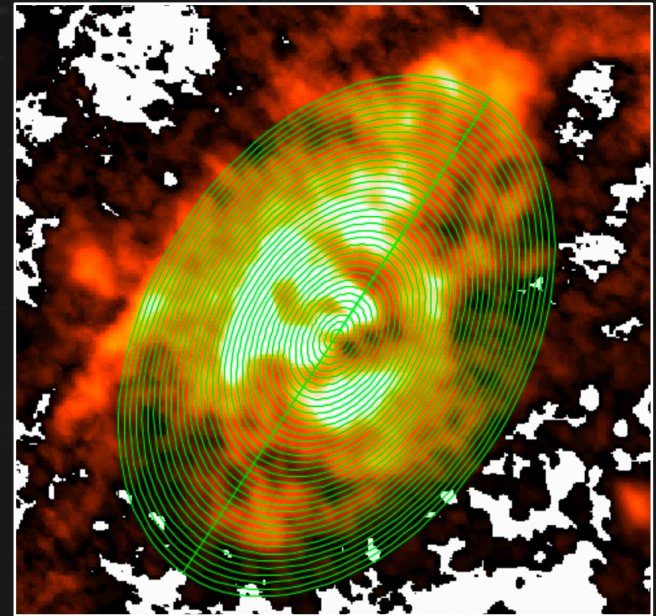


Each ring is 11.5 pc

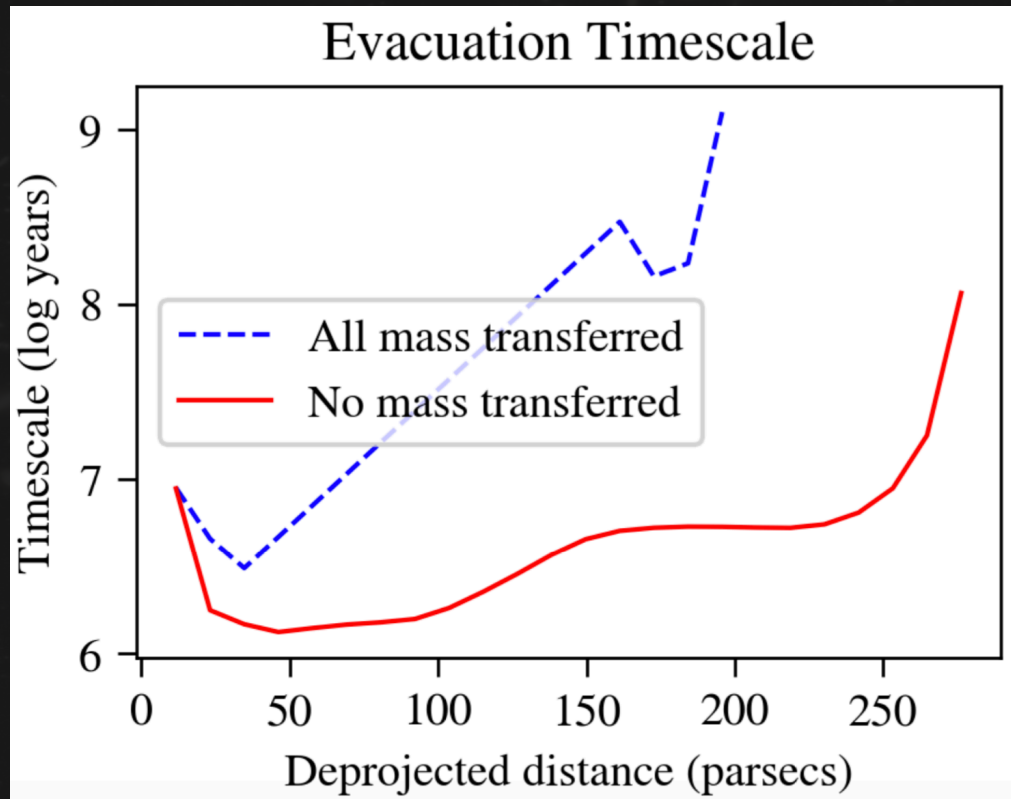
On what timescales do we see ionized gas evacuated from the nuclear region by the winds?

What can we learn about the ionization of molecular gas, and the depletion of the cold gas reservoir?

Cold molecular gas
CO (2-1) emission



Preliminary Results



Evacuation timescale =
depletion + crossing time

On our 11.5 pc scales,
evacuation timescales to edge of
outflows take $\sim 10^6 - 10^8$ years.

This may help establish the
duty cycle of AGN activity on
these timescales.

Thank you!

Key takeaways:

- Use of ionized kinematics to model orientation of outflows
- Utilize ionized and cold molecular gas to study how the latter is depleted and subsequently evacuated

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Website: <http://www.astro.gsu.edu/~falcone>

Check out my first paper: **Falcone et al. 2024, ApJ, 971, 17.**

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Backup Slides

Crossing Time

