

# The link between circumnuclear molecular gas reservoirs, millimetre continua and active galactic nucleus fuelling

Jacob Elford

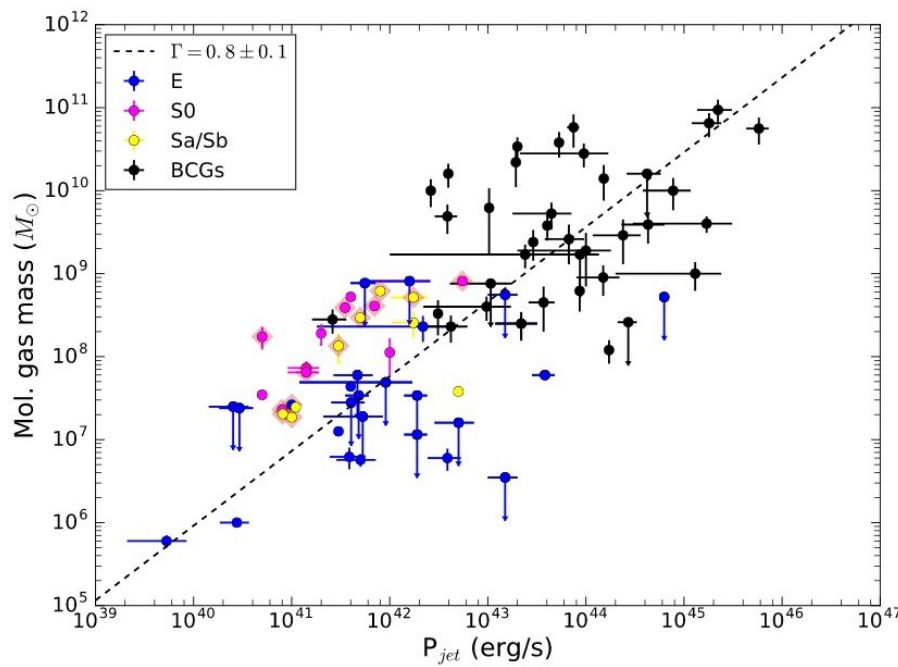
NAM 2025

# **The Link Between Circumnuclear Molecular Gas Reservoirs and Active Galactic Nuclei Fuelling**

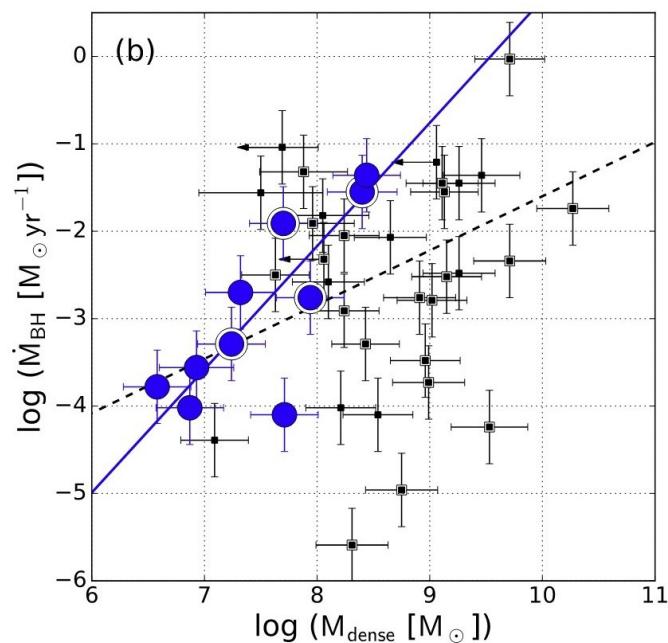
Elford et al 2024 (MNRAS, 528, 1)

# What fuels AGN?

AGN fuelling is still an open question



Babyk et al  
2019



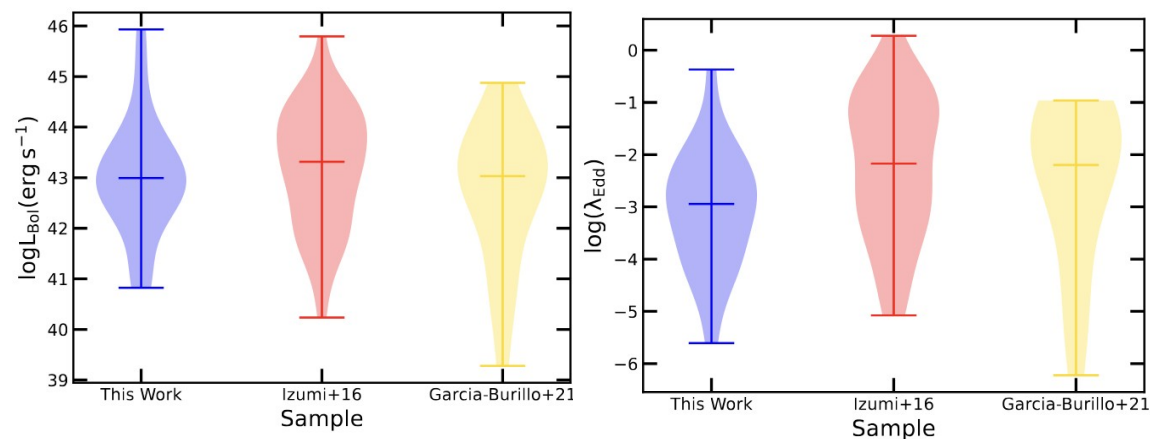
Izumi et al  
2016

# What I did?

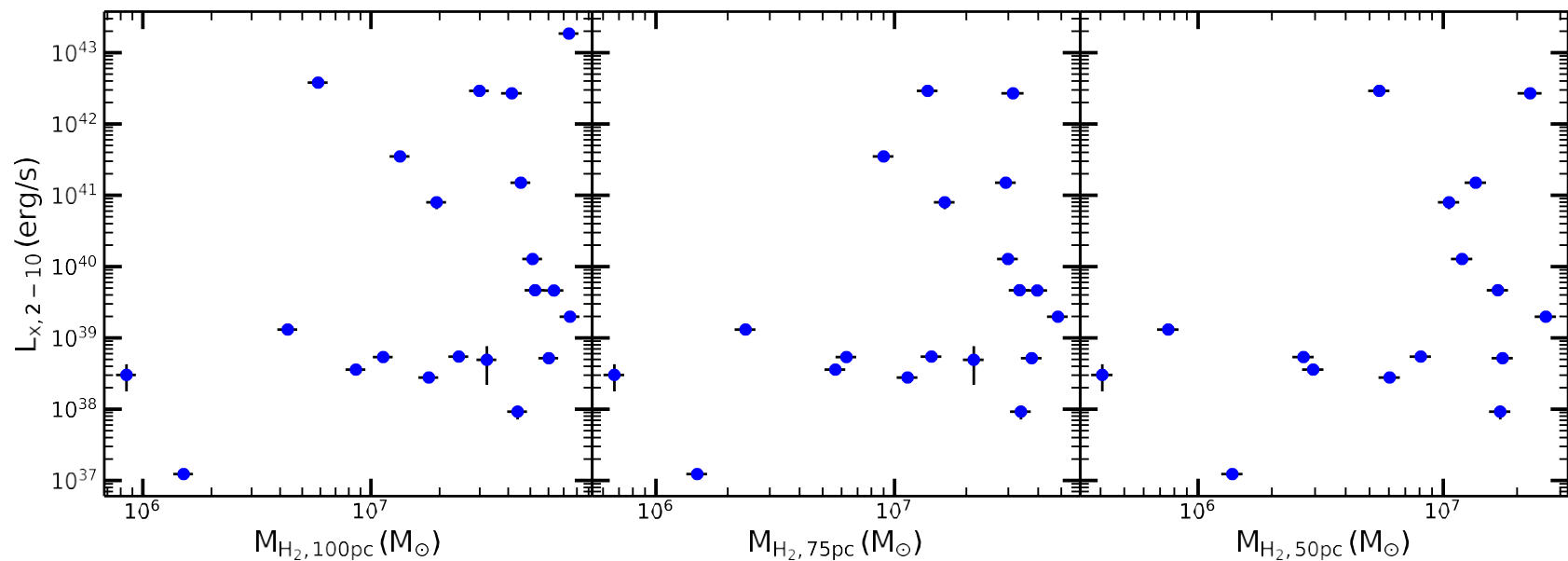
- Does circumnuclear (100pc scale) cold molecular gas power nuclear emission in galaxies?

WISDOM sample

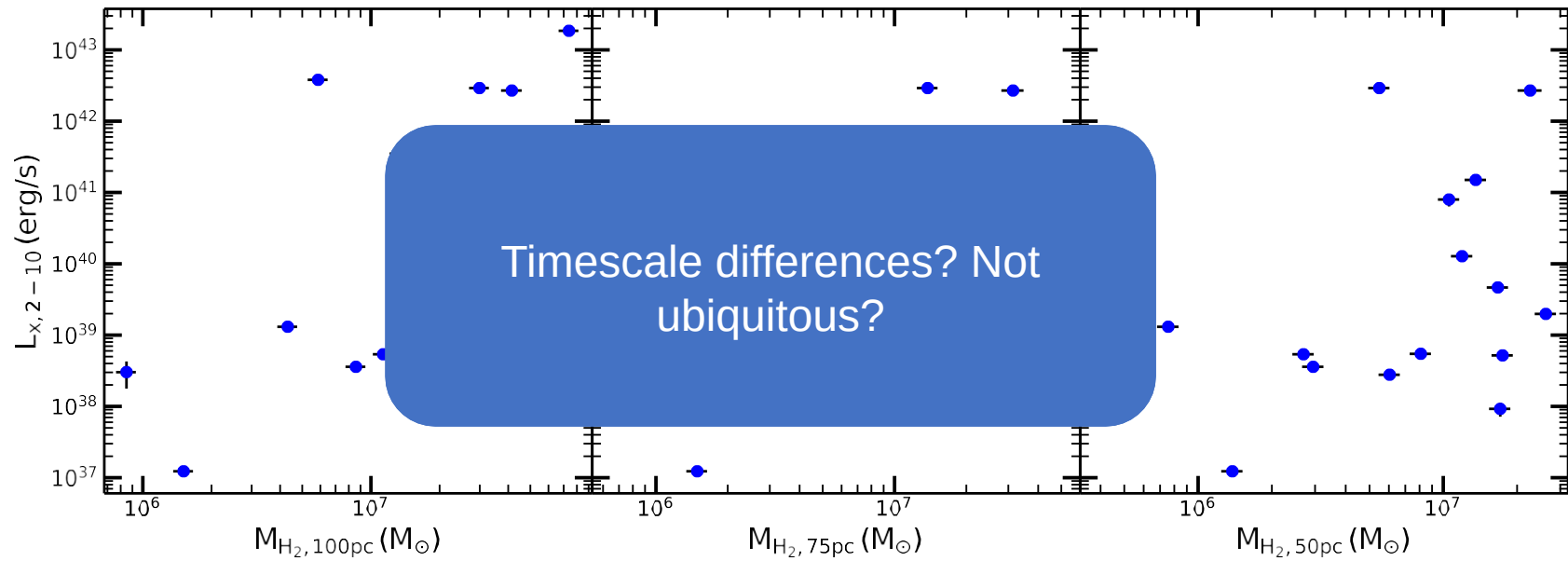
- 35 galaxies
- Range of nuclear activities
- Has a mix of AGN classifications



# Did we find any correlations? No!

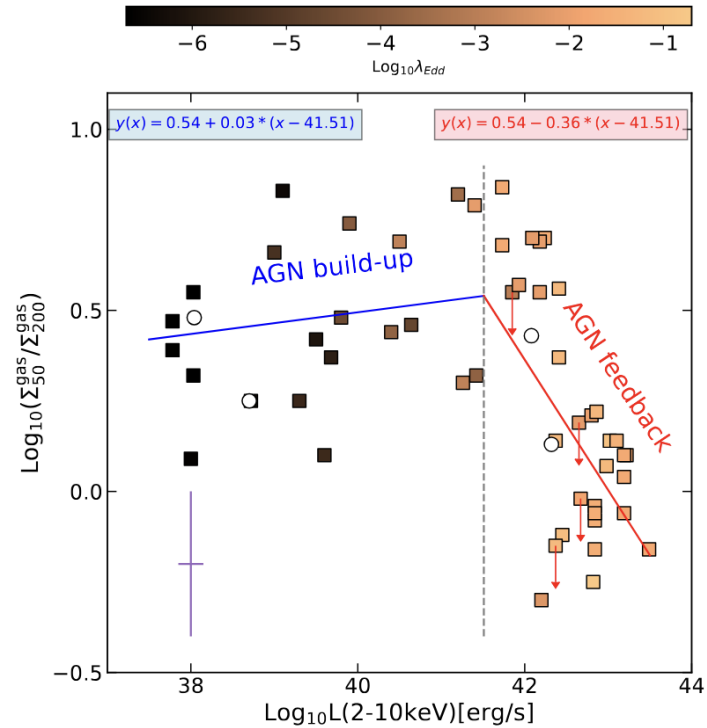


# Did we find any correlations? No!



# Evidence of AGN feedback?

Follow up work has found a two-stage relation

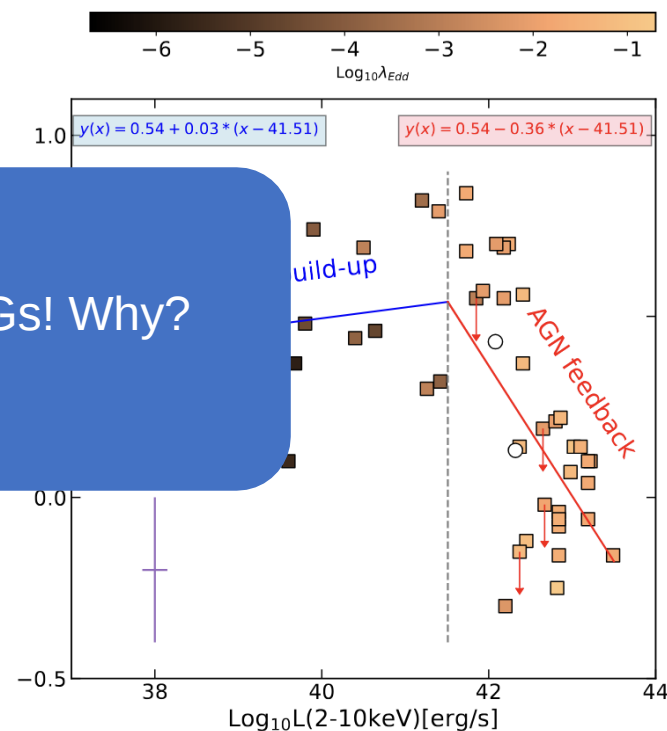


Garcia-Burillo  
et al 2024

# Evidence of AGN feedback?

Follow up work has found a two-stage relation

Only followed by LTGs! Why?



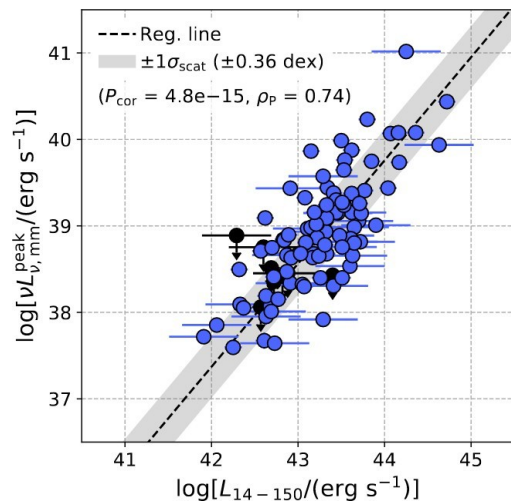
Garcia-Burillo  
et al 2024



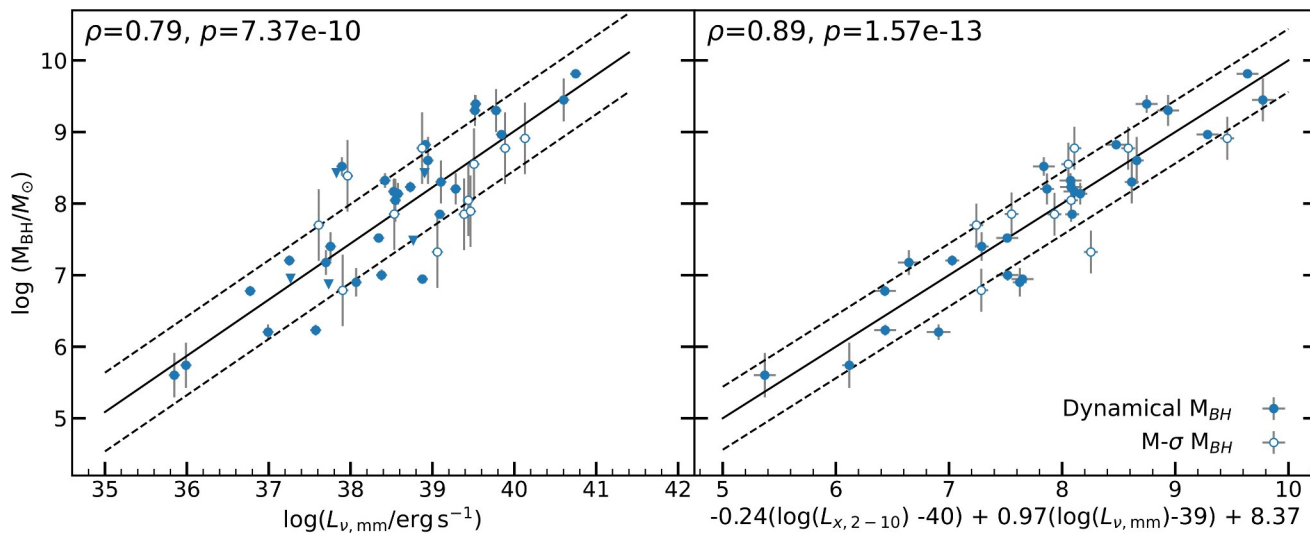
# **A survey of mm variability in AGN**

Elford et al in prep

# Origin of mm emission in RQAGN



Kawamuro et al 2022



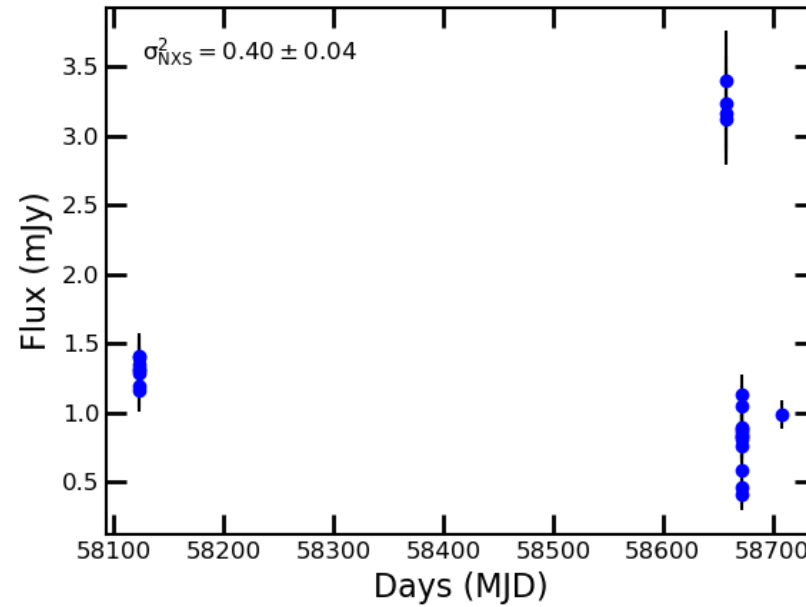
Ruffa, Davis, Elford et al 2023

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# Some sources show short term variability



# Conclusions

- Found a lack of correlations between circumnuclear cold molecular gas and AGN activity which could indicate that AGN fueling is not ubiquitous
- May of found evidence of AGN feedback that follows a two-stage relation but is only followed by LTGs
- Have started to study the short- and long-variability mm variability in AGN to understand the mm emission
- Found a variety of different behaviors in the mm variability