

The Galactic Center Excess: a stellar origin

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In collaboration with: Francesca Calore, Emma Storm & Christoph Weniger

The Galactic Centre Excess

Goodenough & Hooper 2009, Vitale+ (Fermi coll.) 2009, Hooper & Goodenough 2011, Hooper & Linden 2011, Boyarsky+ 2011 (no signal), Abazajian & Kaplinghat 2012, Hooper & Slatyer 2013, Huang+ 2013, Gordon & Macias 2013, Macias & Gordon 2014, Zhou+2014, Abazajian+ 2014, Daylan+2014, Calore+ 2014, Gaggero + 2015, Carlson+ 2015, Fermi-LAT 2016, 2017

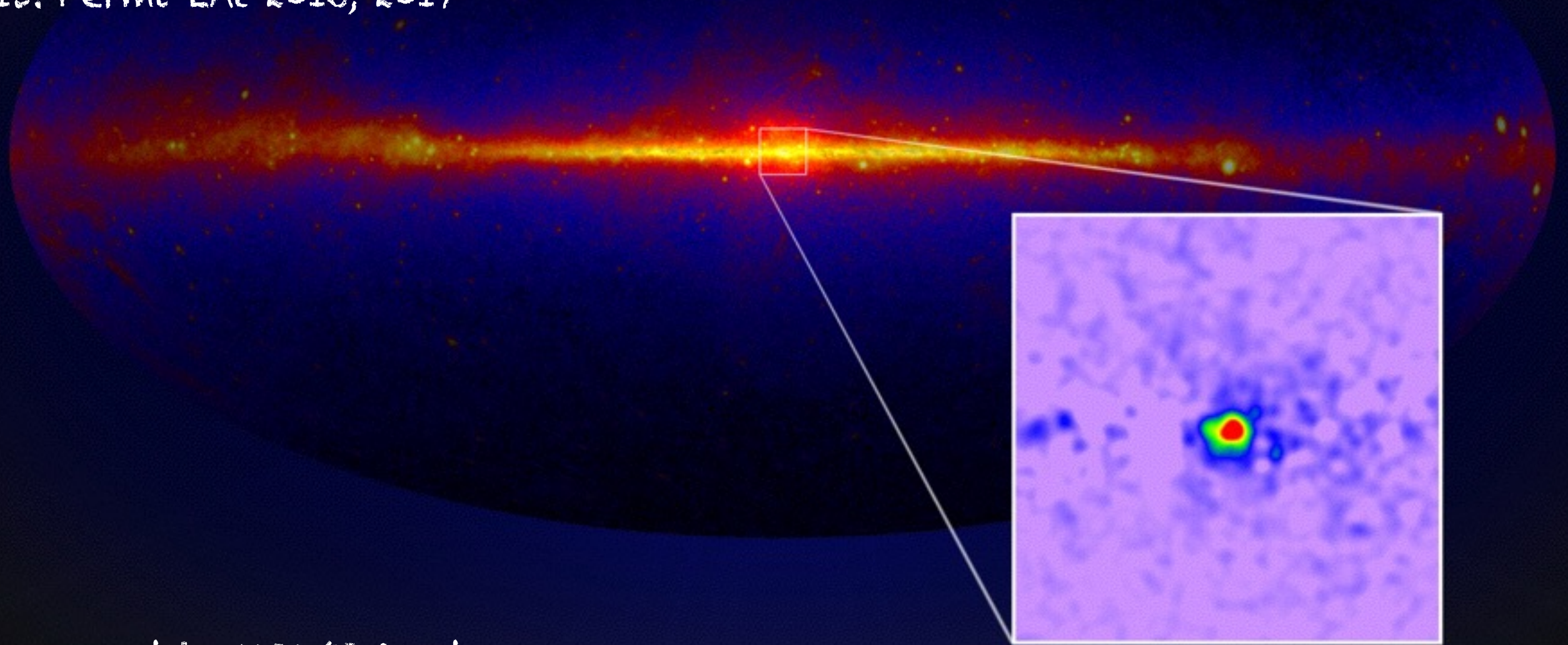
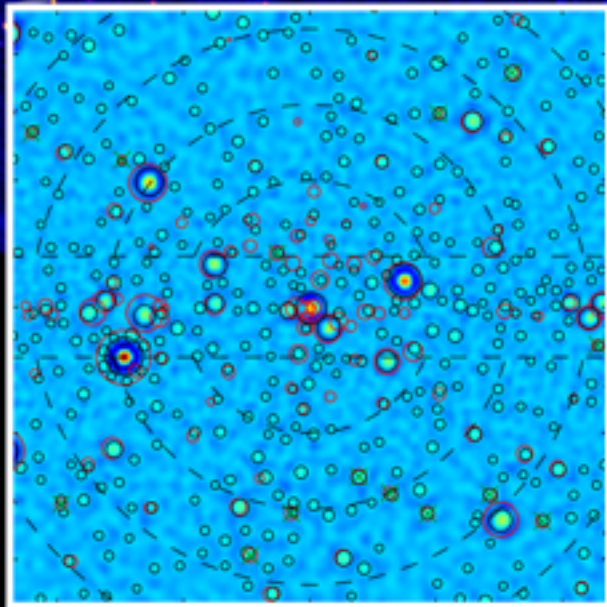


Image credit: NASA/T. Linden

The Galactic Centre Excess

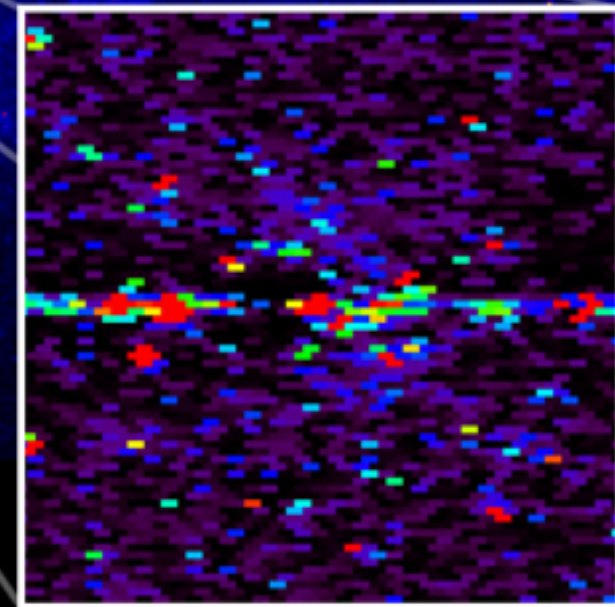
Speckled gamma-ray emission from inner Galaxy points to a new source population

Wavelet transformation



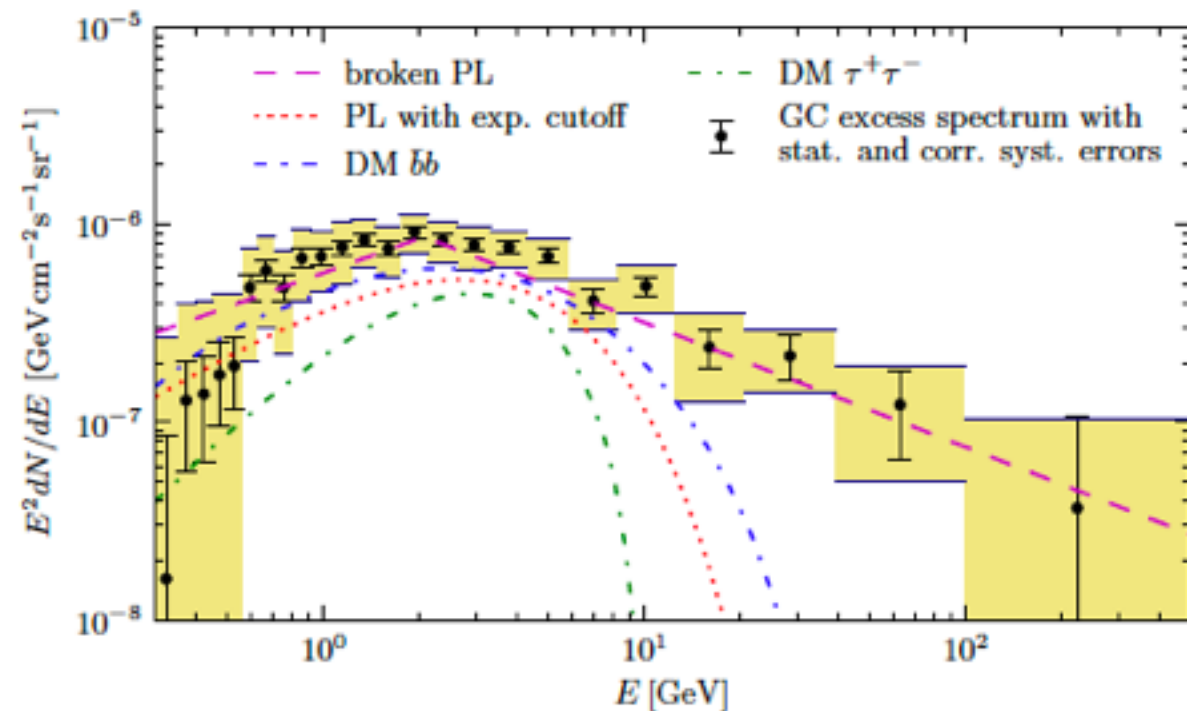
Bartels et al. 2016

Non-Poissonian noise

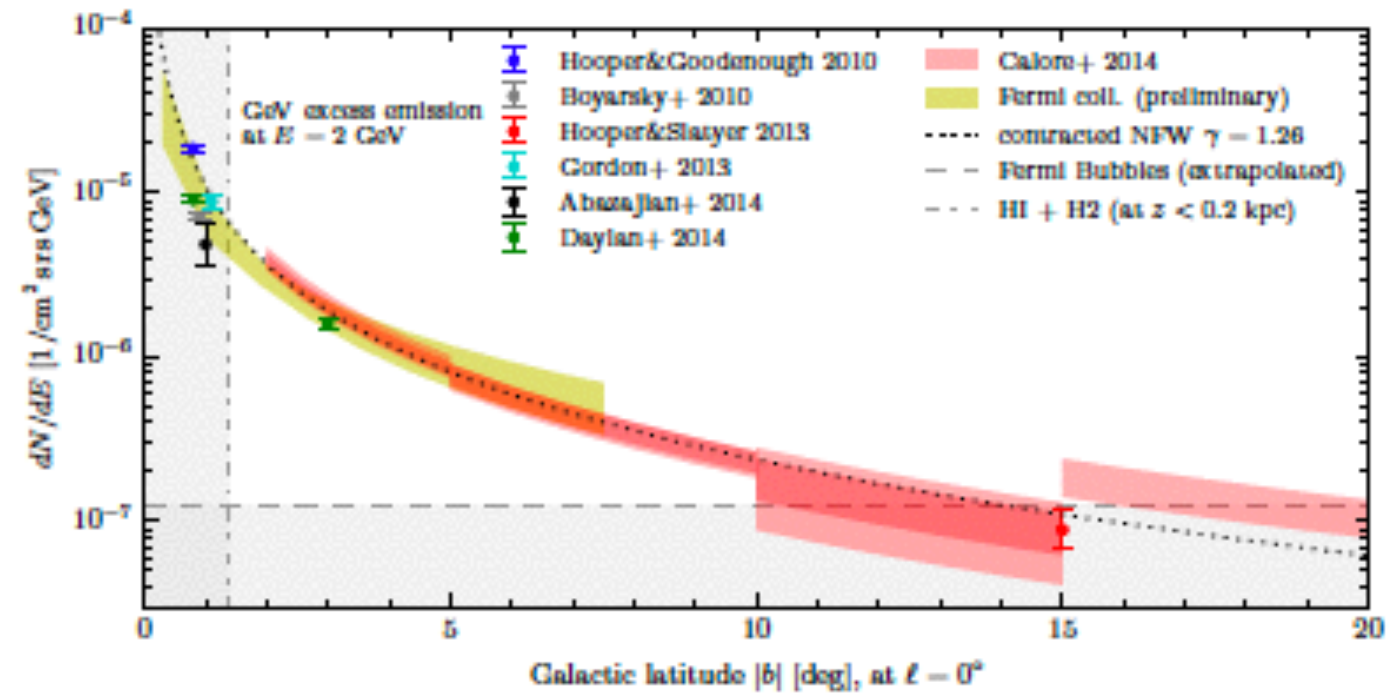


Lee et al. 2016

GCE features



Calore, Cholis & Weniger (2014)



Calore, Cholis, McCabe & Weniger (2015)

SkyFact

Emma Storm
Thu. 14:40
arXiv:1705.04065

Summary:

- Hybrid between image reconstruction & template fitting

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This means:
freedom in spectral and
spatial templates to adapt
to errors/incompleteness!

e.g. "dark gas"

GCE Morphology

- Reanalysis using SkyFACT

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DM



Bartels+ in prep.

GCE Morphology

- Reanalysis using SkyFACT

DM

Stellar Mass distribution

cNFW

Boxy bulge

Nuclear bulge

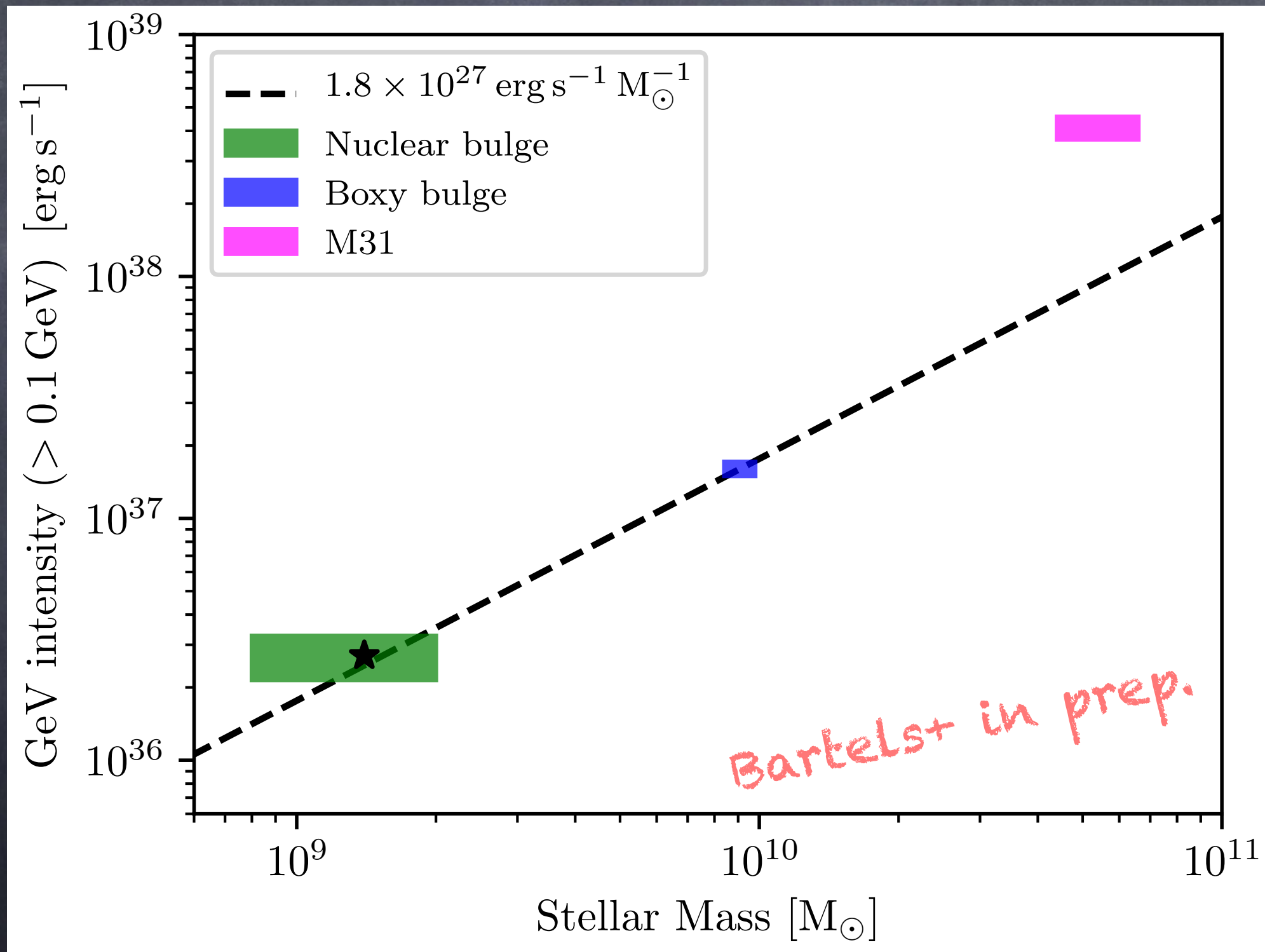
Launhardt+ 2002

Dwek+ 1995; Cao+ 2013

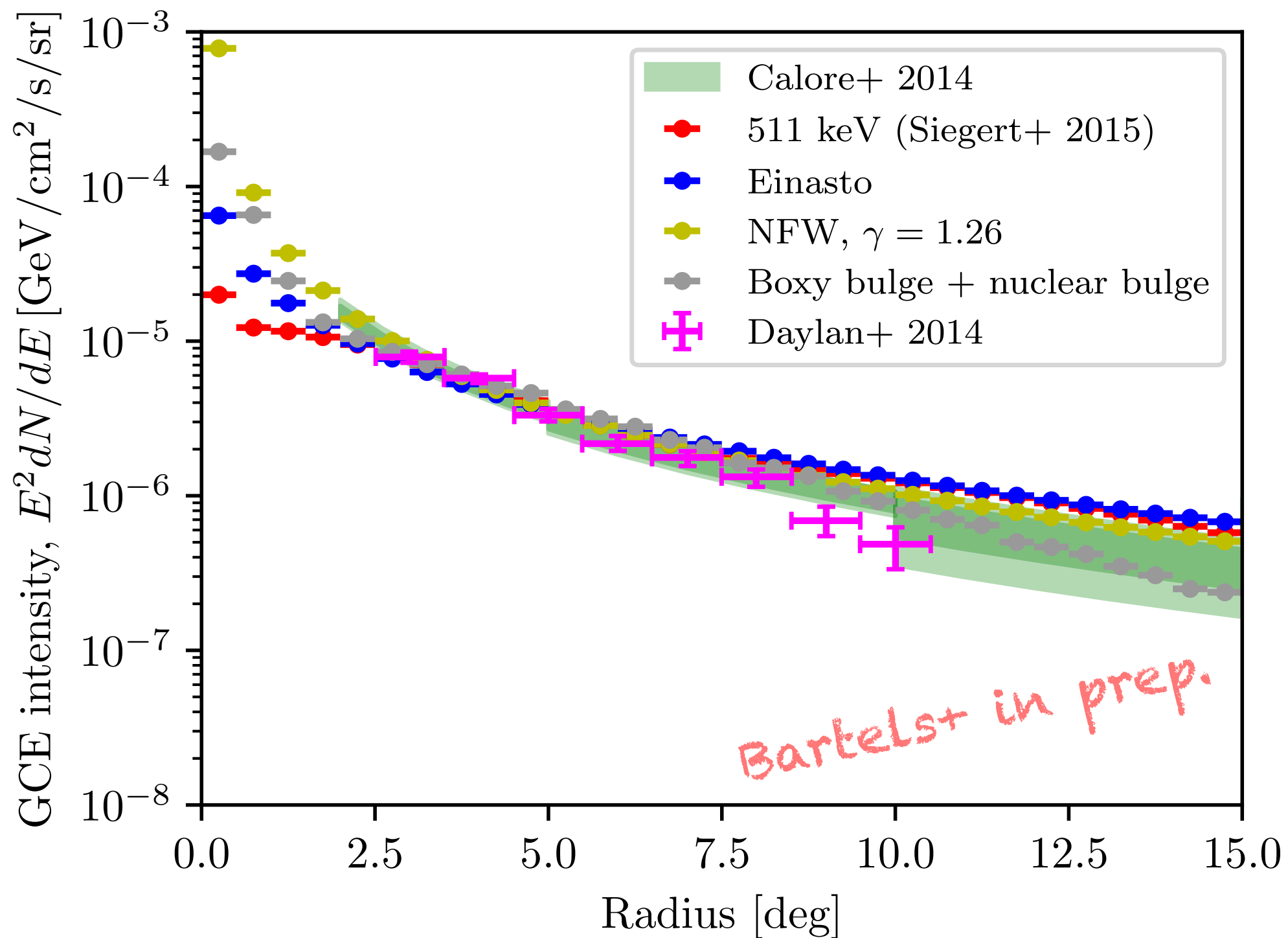
Bartels+ in prep.



GCE vs. Stellar Mass



Surprising?



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- Old analysis: NFW preferred
SkyFACT: Stellar template preferred
- Difference arises when:
Modulation in gas + ICS templates is turned on.

Conclusion

- Reanalysed the GCE with SkyFACT
- We find a correspondence with the Bulge + nuclear bulge
- GCE appears to trace stellar mass

THANK YOU :)