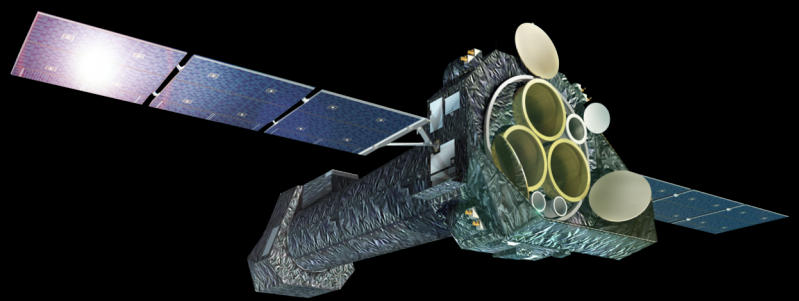
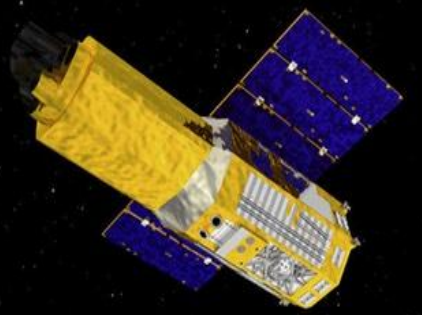
Evidence for a Massive Hot Circumgalactic Medium Enveloping a Large, Luminous Galaxy

Sanskriti Das (*das.244@buckeyemail.osu.edu*)

Department of Astronomy, The Ohio State University





(Das, S. *et al*., 2019, ApJ, 885, 108 and Das, S. *et al*., 2020, (in press) arXiv: 2003.13953)

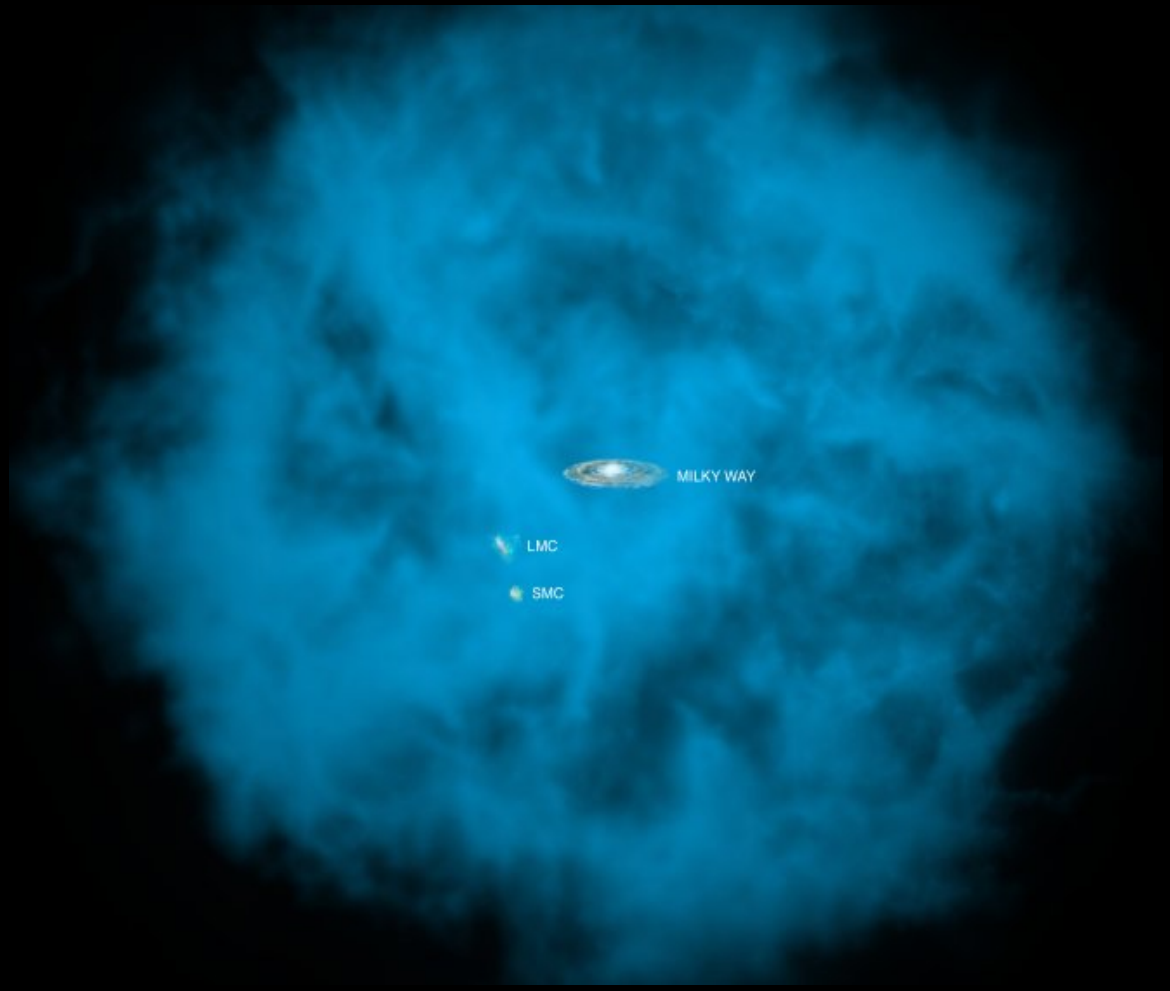


Image courtesy: *Chandra* (from Gupta A. et al. 2012, ApJL)

We have discovered ~1 million K hot, massive, extended CGM around the first external luminous (Milky Way-like) galaxy

The only other luminous galaxy where we know of this hot and massive gas is our own Milky Way

The CircumGalactic Medium (CGM) is the gas that surrounds a galaxy.

The stars and the gas between stars have a smaller amount baryonic matter than expected for a given amount of dark matter. This is called “Missing baryons” problem. CGM is *believed* to be a potential solution.

CGM plays a crucial role in the formation and evolution of a galaxy through accretion, feedback and recycling.

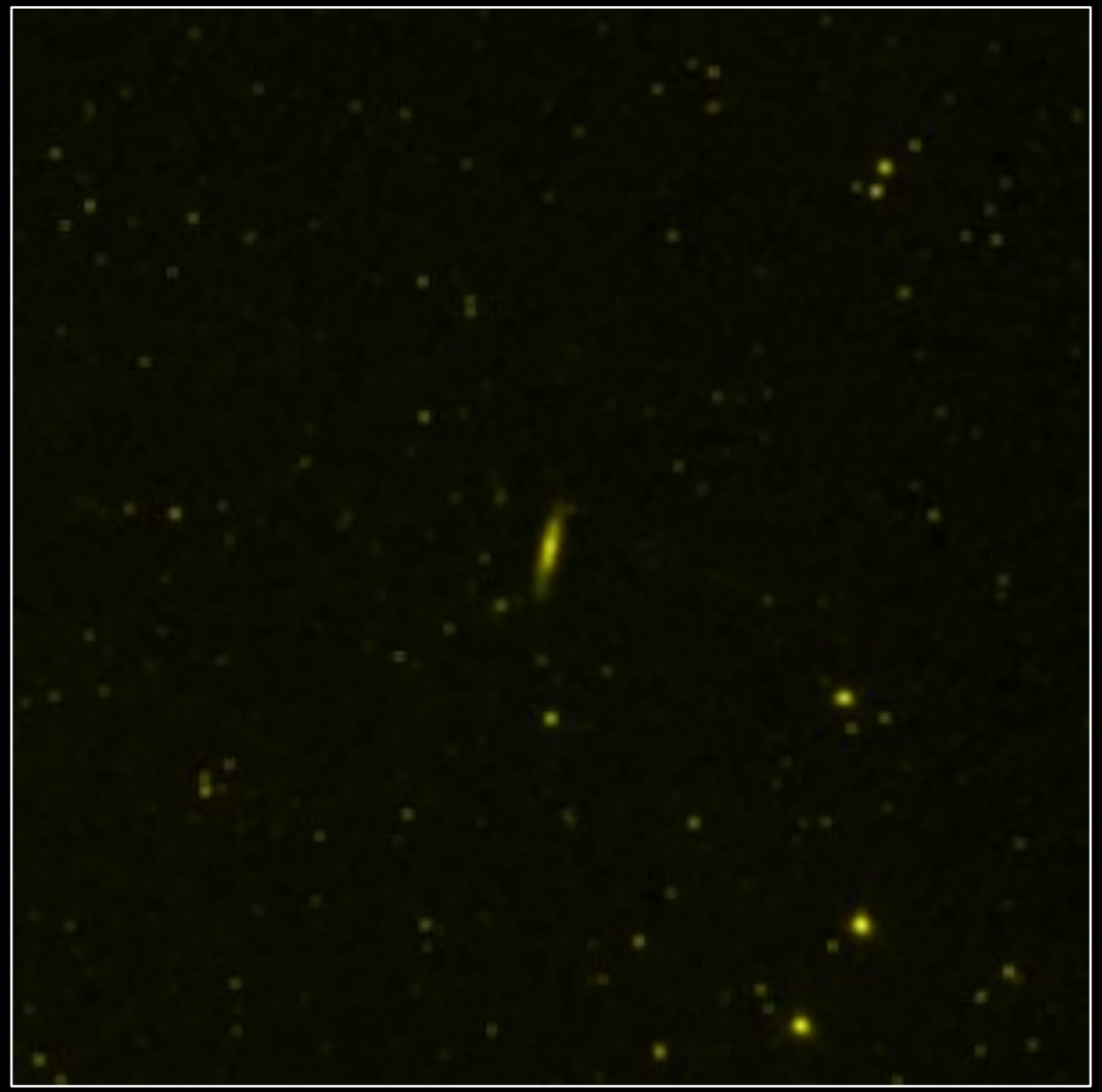


Image courtesy: DSS

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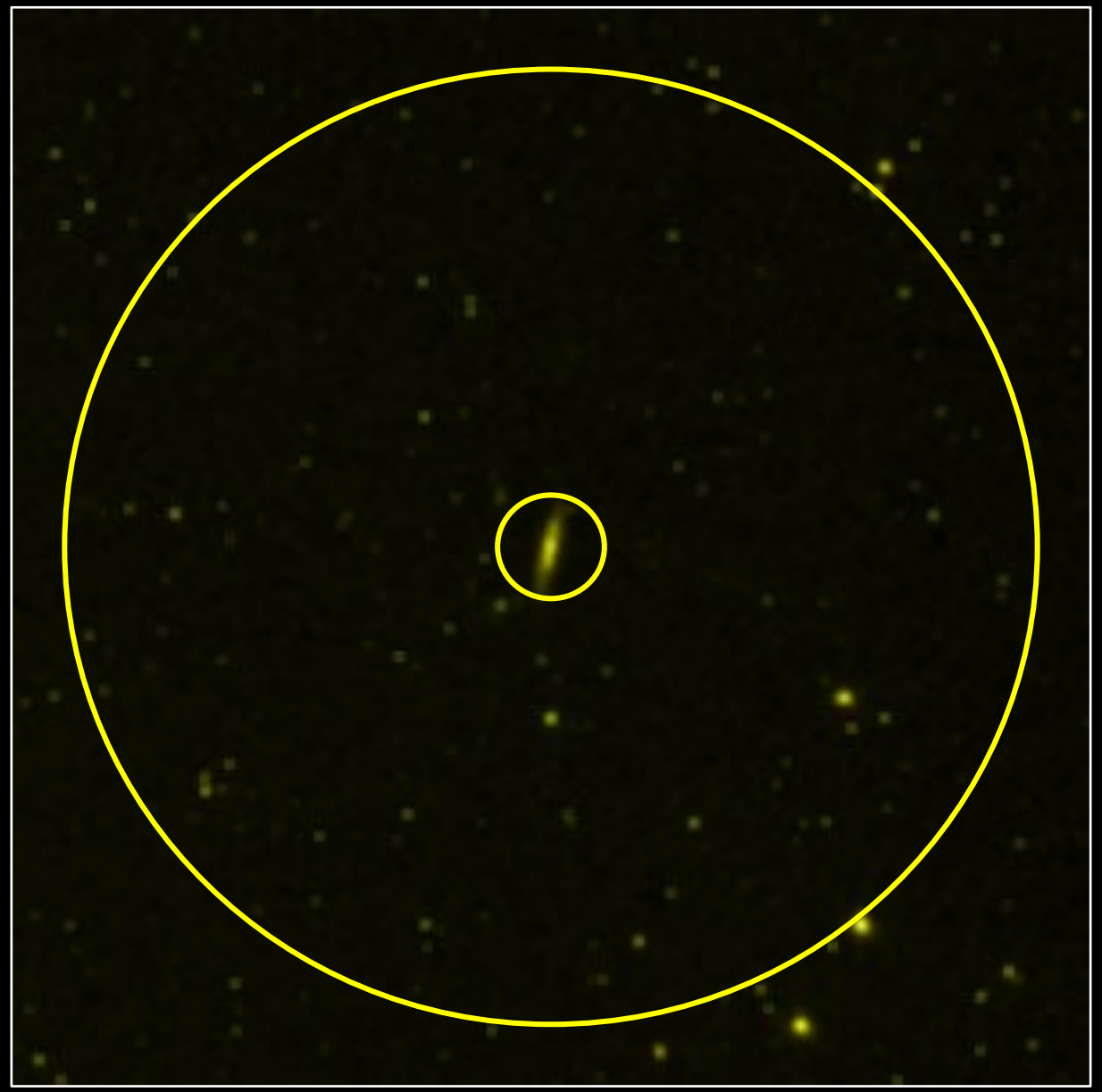
- The galaxy is 60 million parsecs away



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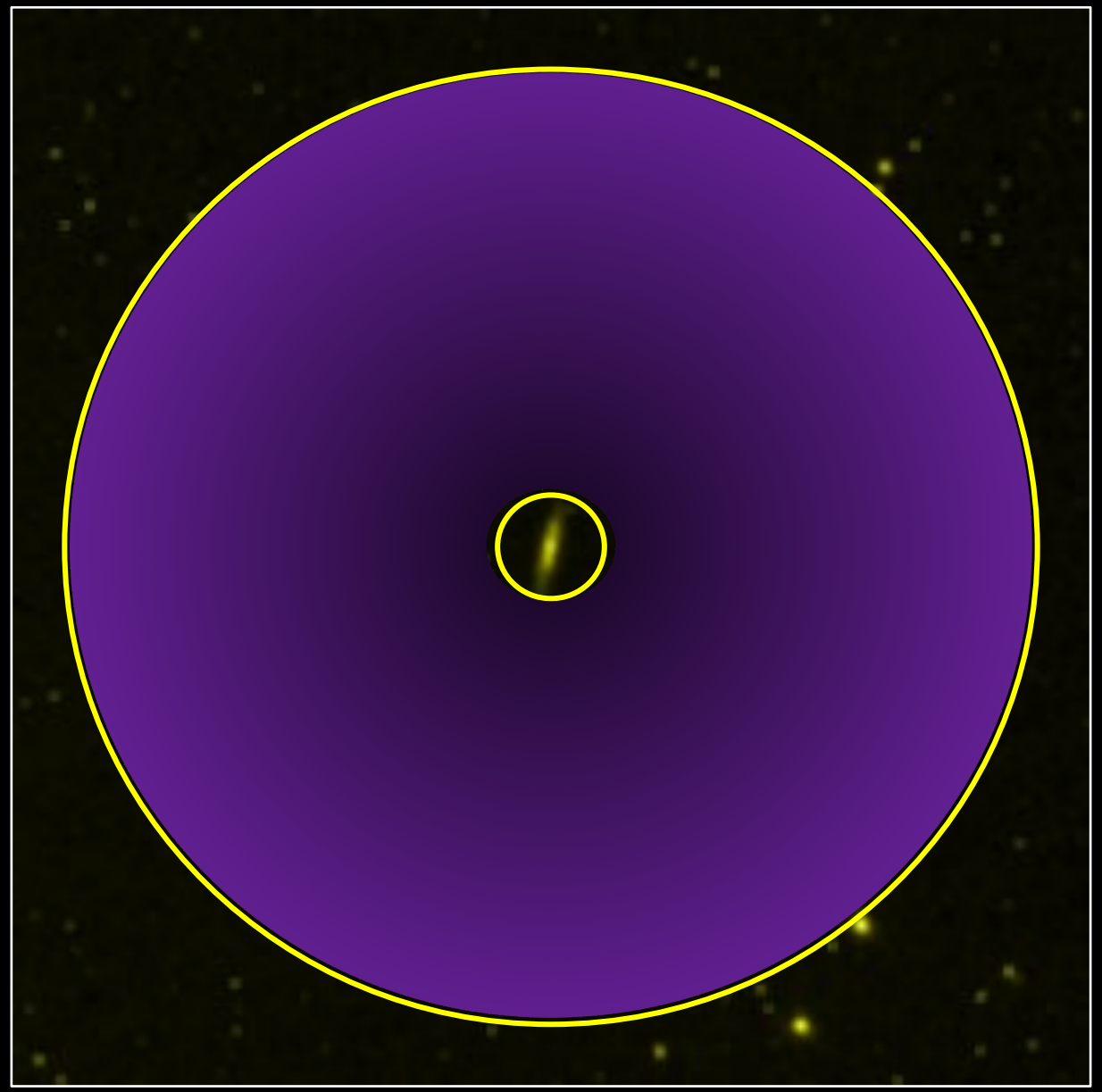

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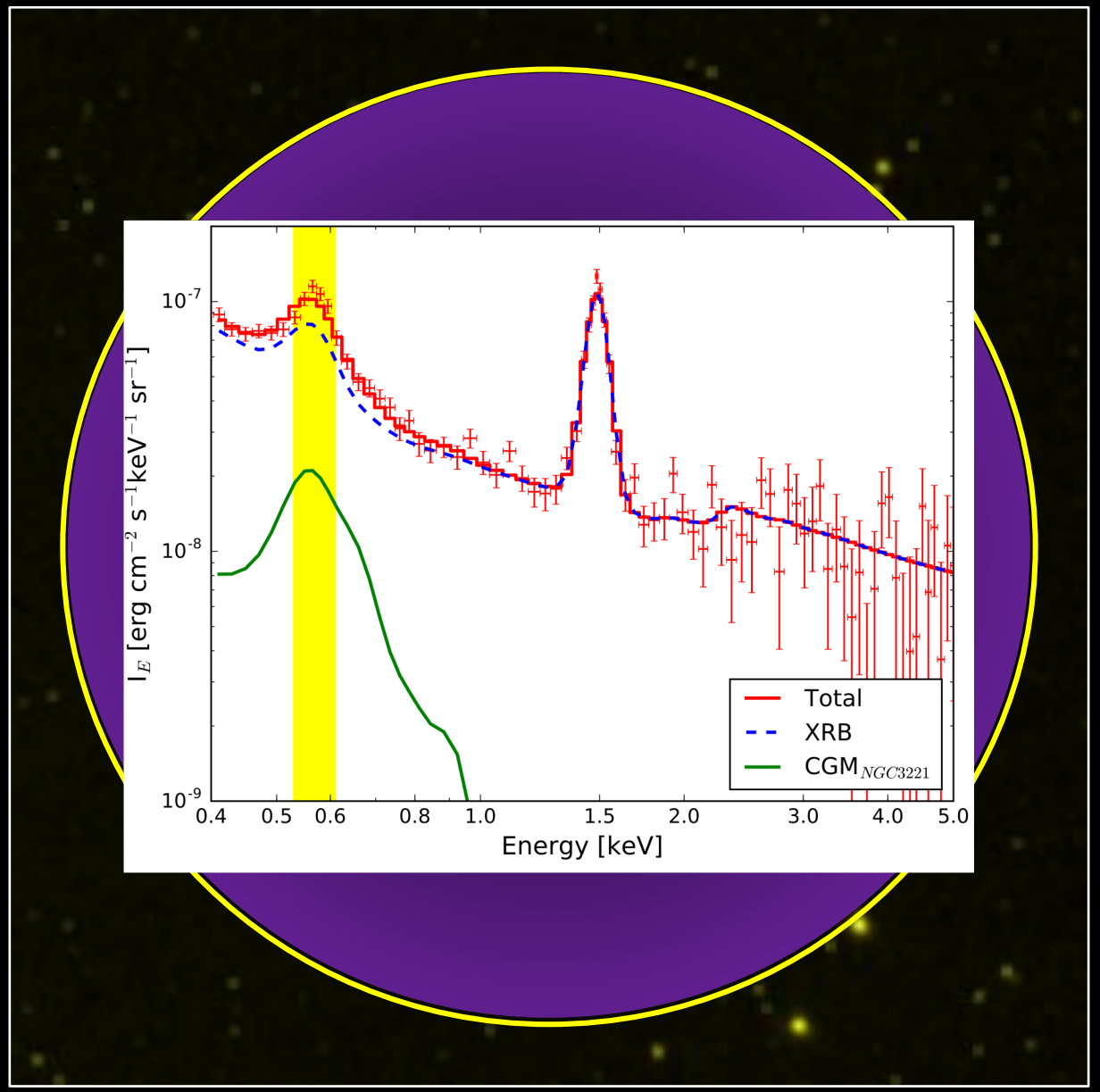

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We detect hot CGM extended out to 200 kilo parsecs from the galaxy. The galaxy is only 30 kilo parsecs across

Excited by the detection of the CGM, we characterize its physical properties, e.g., density, temperature, mass etc.

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The mass of the hot CGM is ~ 10 billion M_{sun}. There is as much mass in the CGM as in the stars of this galaxy. The mass of the hot CGM accounts for the "missing" *galactic* baryons of this galaxy.

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CGM is an integral part of the galaxy system.
CGM should be viewed as **in** the galaxy rather than **around** the galaxy

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