



AGN feedback, quiescence and CGM metal enrichment in early-type galaxies

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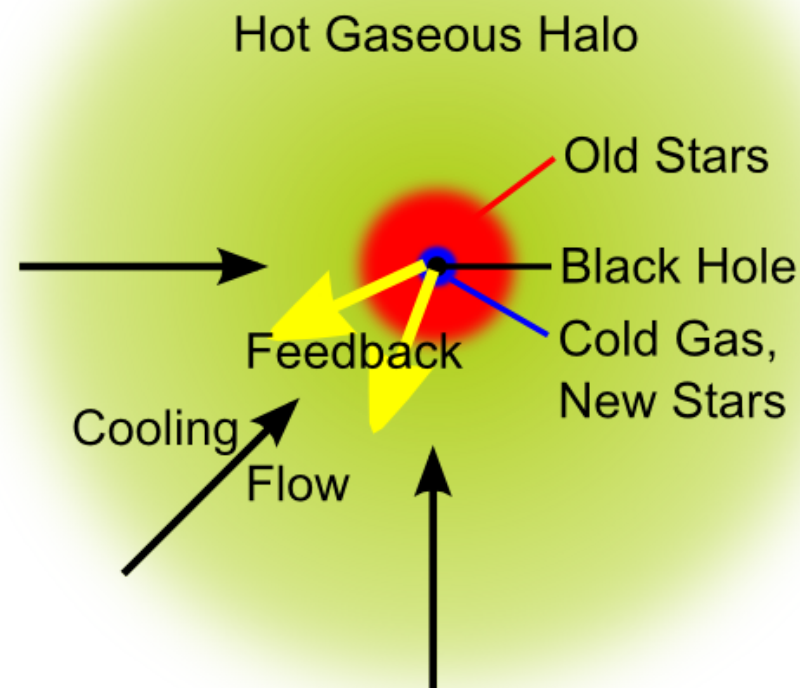
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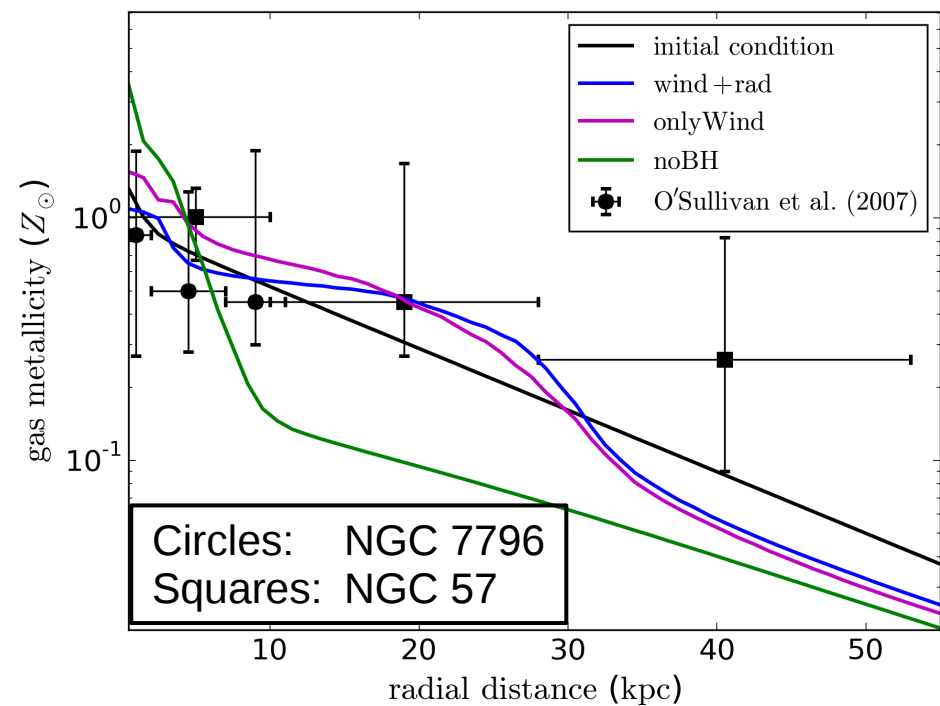
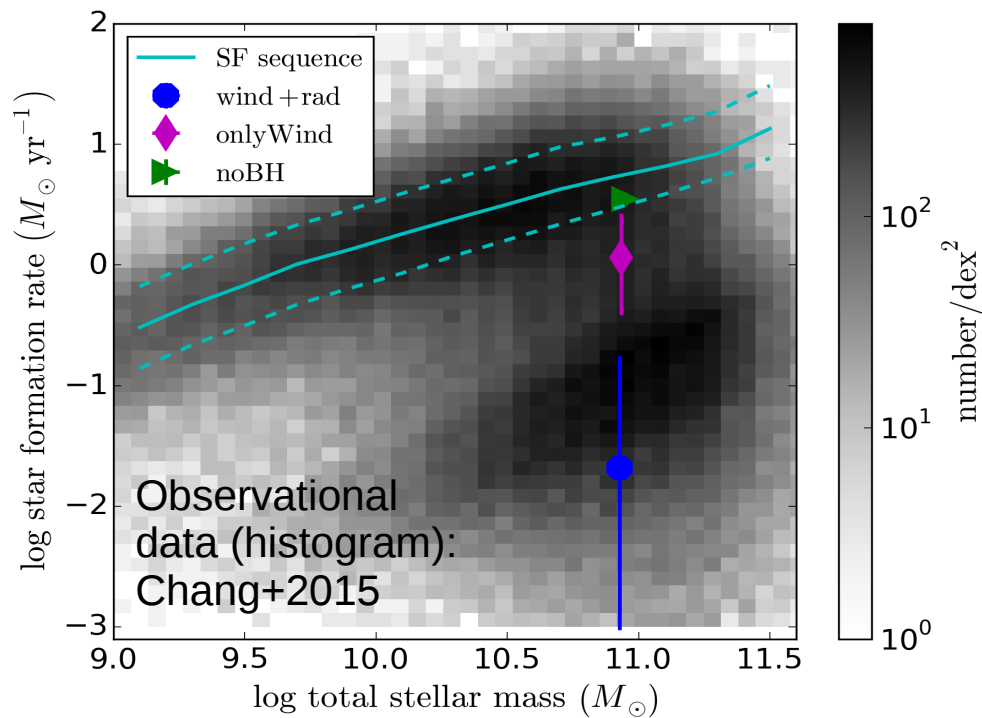
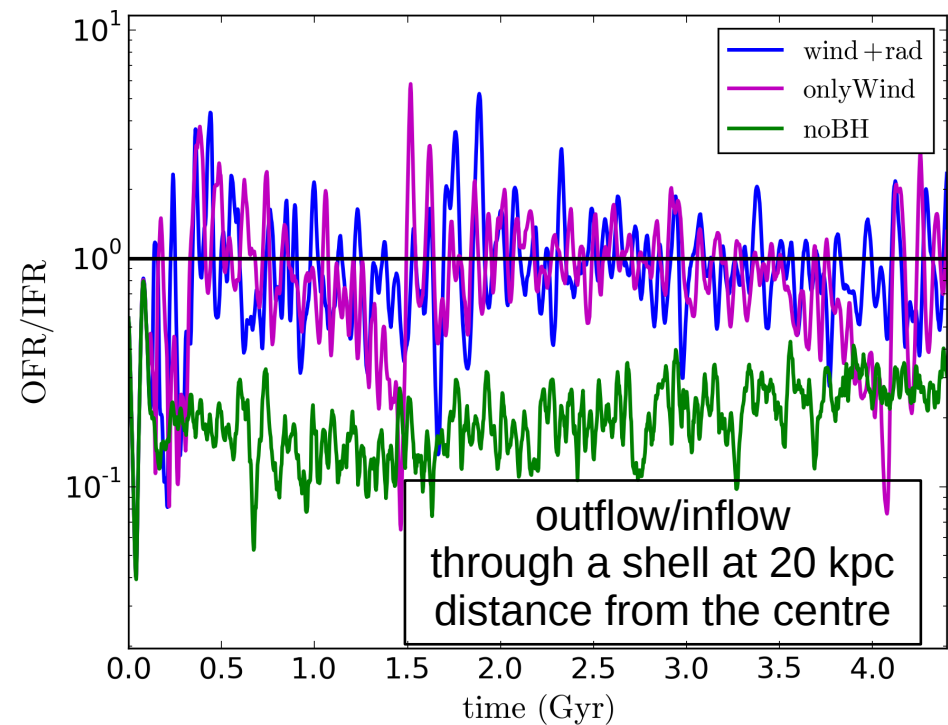
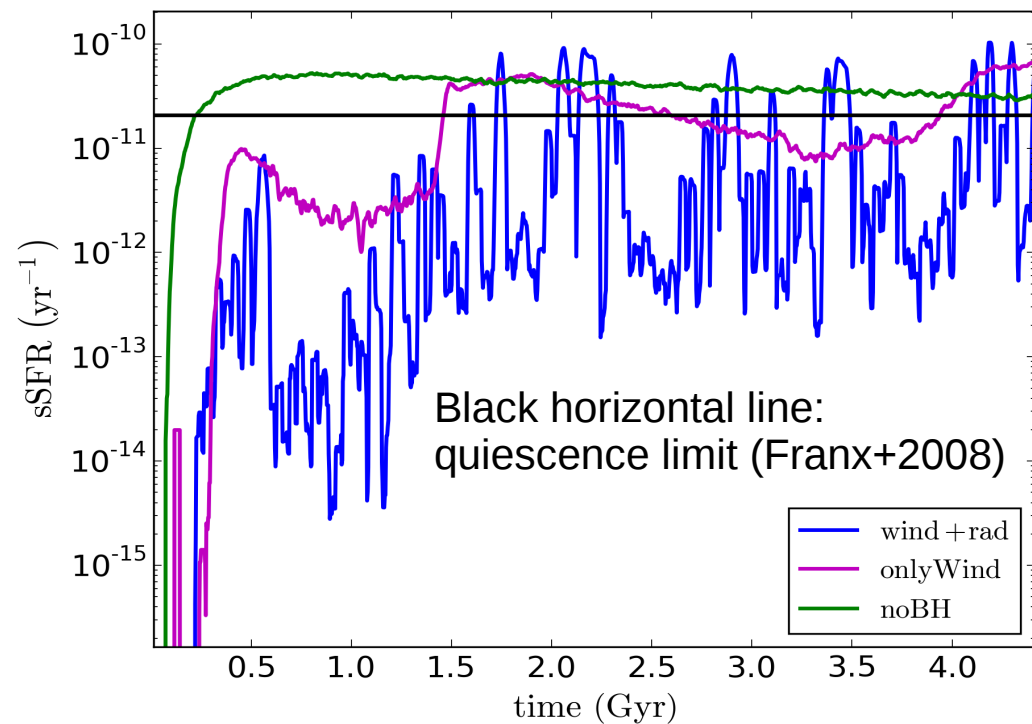
- **Elliptical Galaxies at low redshifts:**

- Red, old, quiescent (very little star formation), little to no cold gas
- Surrounded by hot gaseous halo
- **Feedback from central SMBH** likely stopping permanent cooling flow, maintaining quiescence

- **Our work:**

- Hydrodynamic simulations (SPHGal) with cooling, star formation, stellar feedback, metal enrichment
- **Black hole feedback:** mechanical wind & radiative heating/pressure (Choi+2012)
- **Initial condition:** idealized, massive, isolated, spherical galaxy following observed scaling relations
- **Resolution:** 10^5 solar masses baryon particle mass
- **Three models:**
 - Without BH accretion/feedback (**noBH**)
 - With only mechanical wind feedback (**onlyWind**)
 - With both wind & radiative feedback (**wind+rad**)





Conclusions

- **BH feedback necessary to and capable of keeping (isolated) ETG quiescent**
- Radiative feedback strongly reduces SFR compared to just wind feedback
- BH wind feedback creates **large-scale, metal-rich outflows** that enrich the CGM out to about 30 kpc, but outflowing gas stays bound to the galaxy and falls back towards the centre (no net-outflow, “galactic fountain”)
- No lasting enrichment or other influence farther out than ~30 kpc