Just a few (really) basic notes on AGN:
From discussions with Andy L and David H.:

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1 Accretion Disk Basics

Classic References:
Shakura & Sunyaev (1973)
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Richards et al. (2006)
?, and the paper trail therein...

Good links: Schwarzschild radius: https://en.wikipedia.org/wiki/Schwarzschild_radius www-astro.physics.ox.ac.uk/~garret/teaching/lecture7-2012.pdf jila.colorado.edu/ pja/astr3730/lectur

$$R_{\mathrm{Sch}} = \frac{2GM}{c^2} \tag{1}$$

The Event Horizon is at 2 Schwarzschild radii !!!
$L = 4\pi\sigma R^2 T^4$.

$$T = (Lc^4)/\sigma\pi G^2 \tag{2}$$

$$L = 6.37M. \tag{3}$$

WTF.

$$\Delta E_p = \frac{GMm}{R} \tag{4}$$

with $R = 2GM/c^2$ gives

$$\Delta E_p = \frac{mc^2}{2} \tag{5}$$

but “of course” this wont go all into ’shining’, turns into K.E., and you need some friction... etc. etc. etc. :-) But then divide by two for rotation and divide by 3 for LSO (last stable orbit). ie. $\sim 1/12$.

$$E = \mu \Delta m c^2 \tag{6}$$

and thus

$$L = \mu \Delta \dot{m} c^2 \tag{7}$$

μ is 0.7% for nuclear fusion.
μ is 10-40% for grav. potential accretion.
And, L for BHs doesn’t depend on the mass of the BH (!!)

L increases with ṁ, upto the Eddington Luminosity.
The luminosity itself cuts off itself the growth (in L).

λ T = 2900 (L in μm and T in K)
$\Rightarrow$ if T = 100,000K then $\lambda = 0.03\mu$m,
i.e. and the EUV.
12.6 eV is $\sim$1 keV

2 References

Ross et al. (2007)

References

Richards G. T., et al., 2006, ApJS, 166, 470

Ross N. P., et al., 2007, MNRAS, 381, 573

Shakura N. I., Sunyaev R. A., 1973, Astron. & Astrophys., 24, 337