E-ELT DRM

The Physics and Mass Assembly of Galaxies
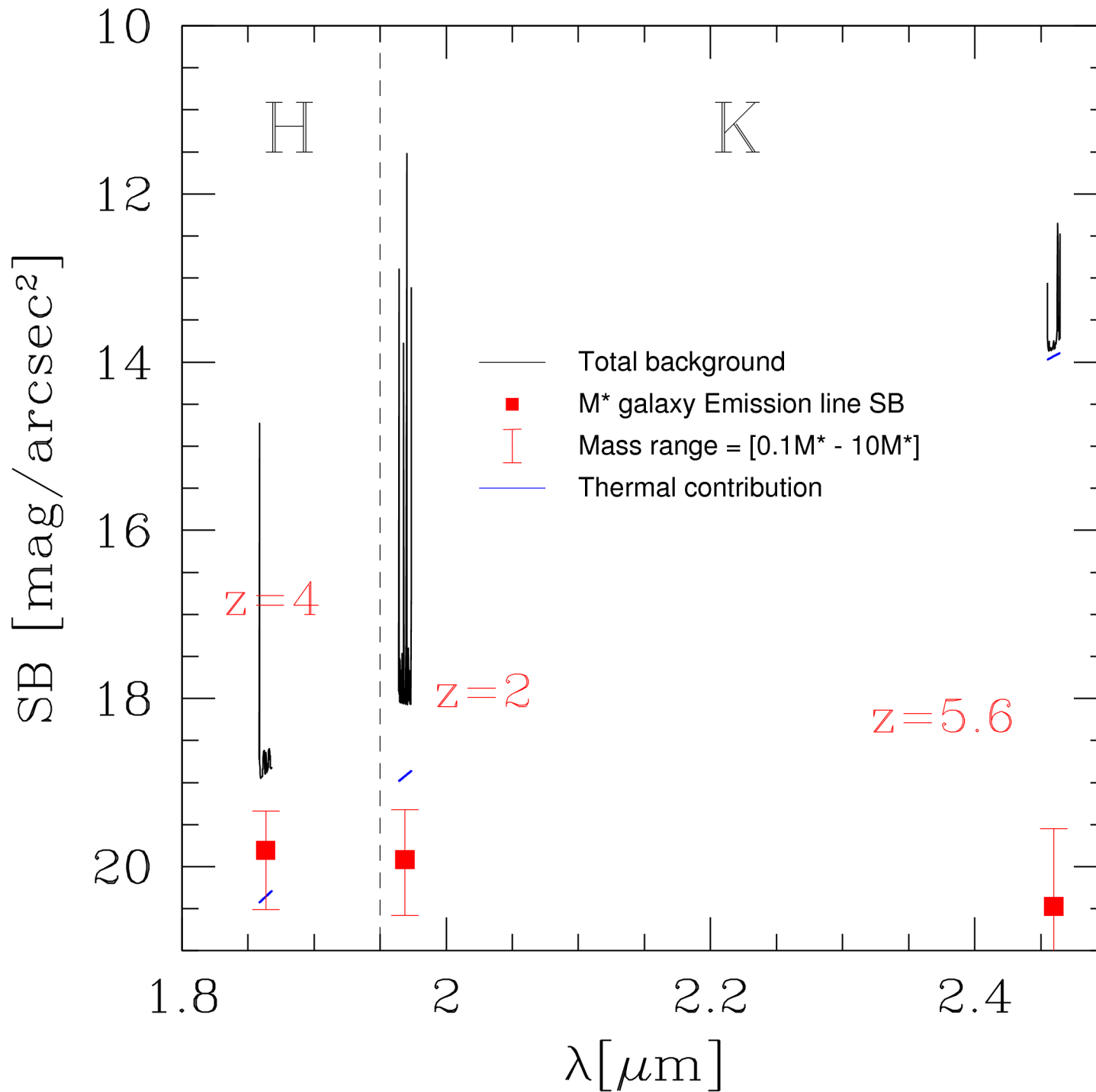
Additional information

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ToDo List
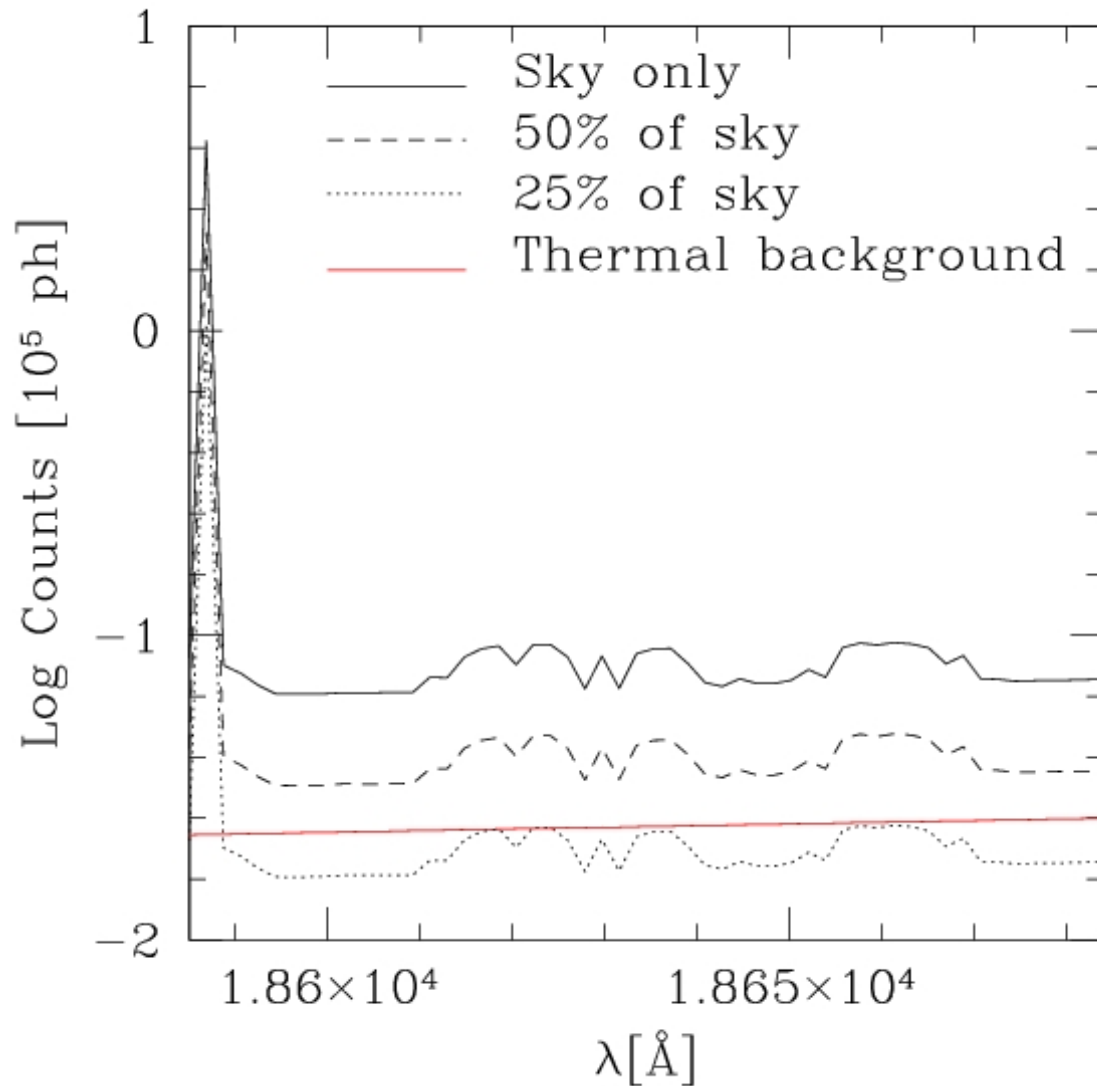# From last SWG meeting (Apr08)

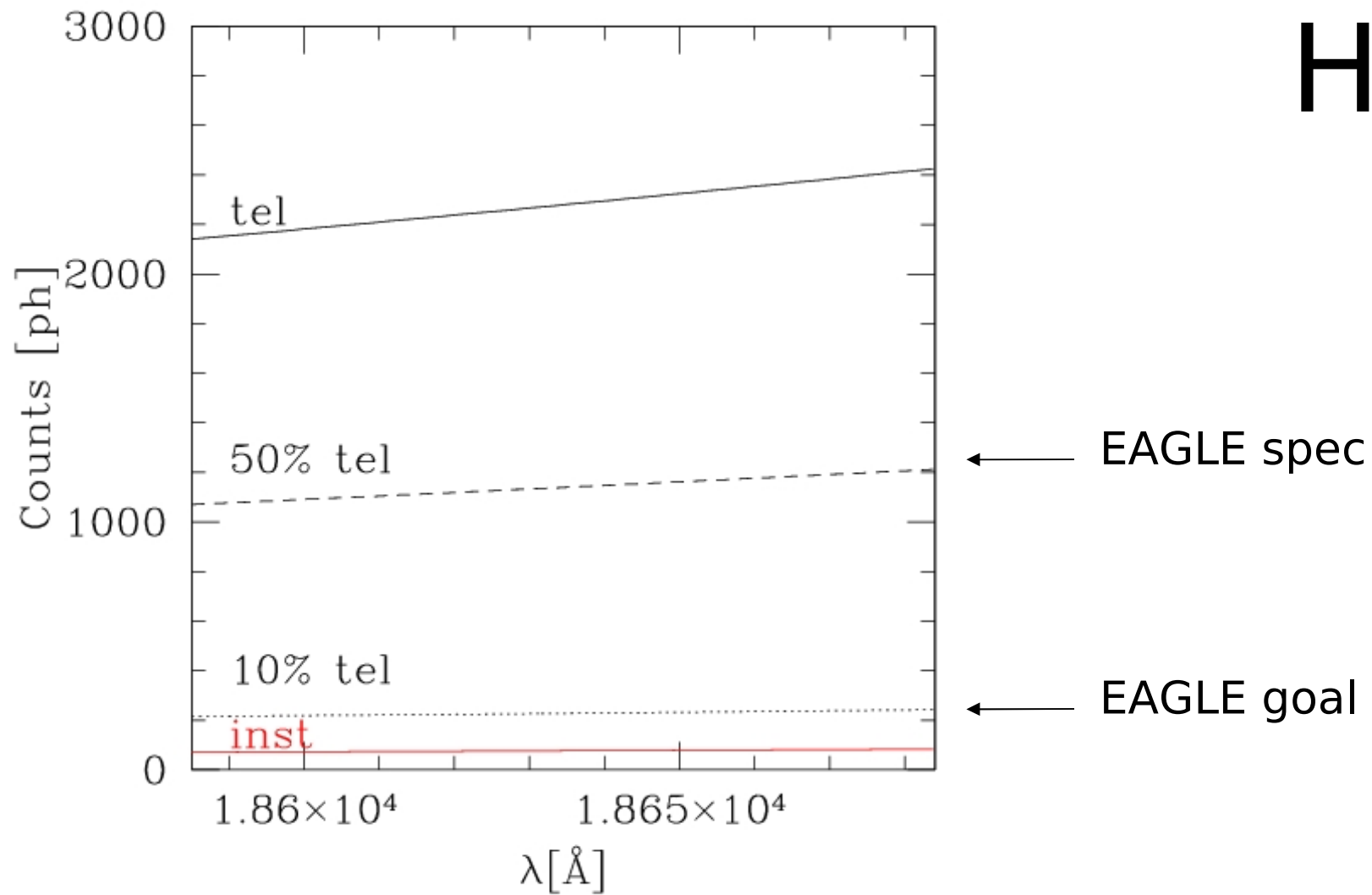- Clarify dominant source of background vs. z and band

- Impact of site background

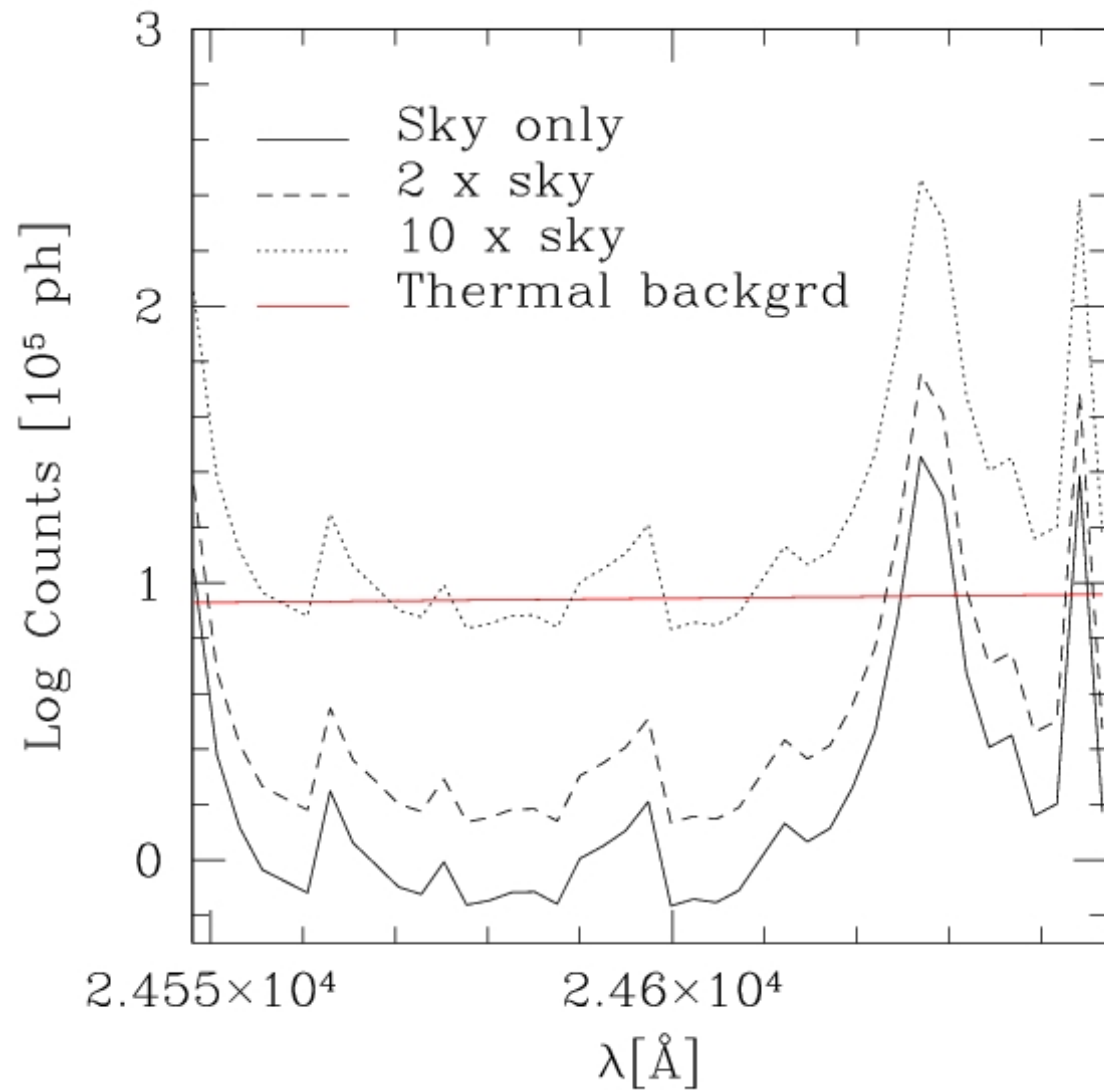Thermal Background: significant impact only above z>5

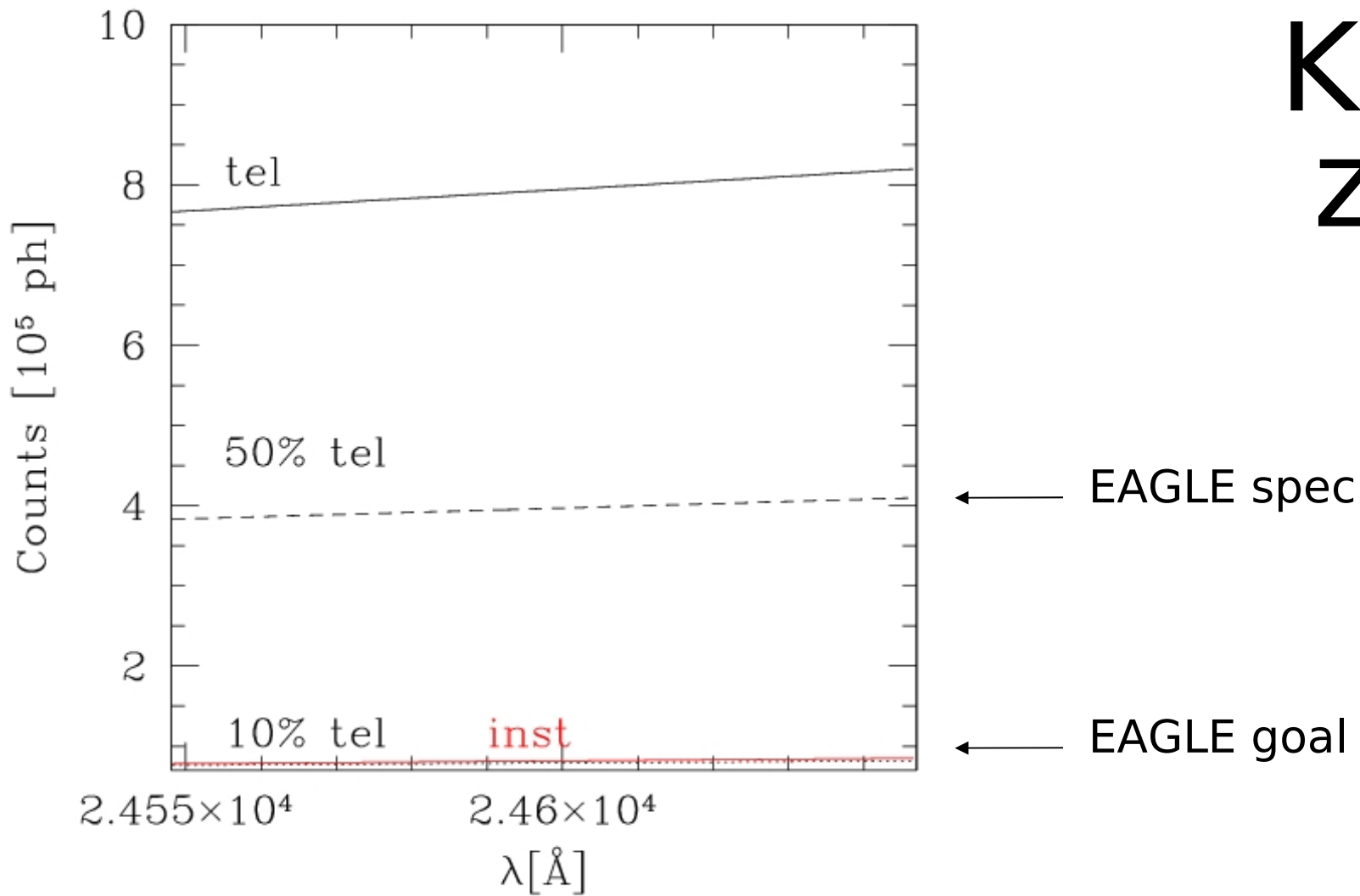H-band z=4

Thermal background = 25 % of sky background

Telescope > 90% of total thermal background

K-band
z=5.6

Thermal background = 10 x sky background
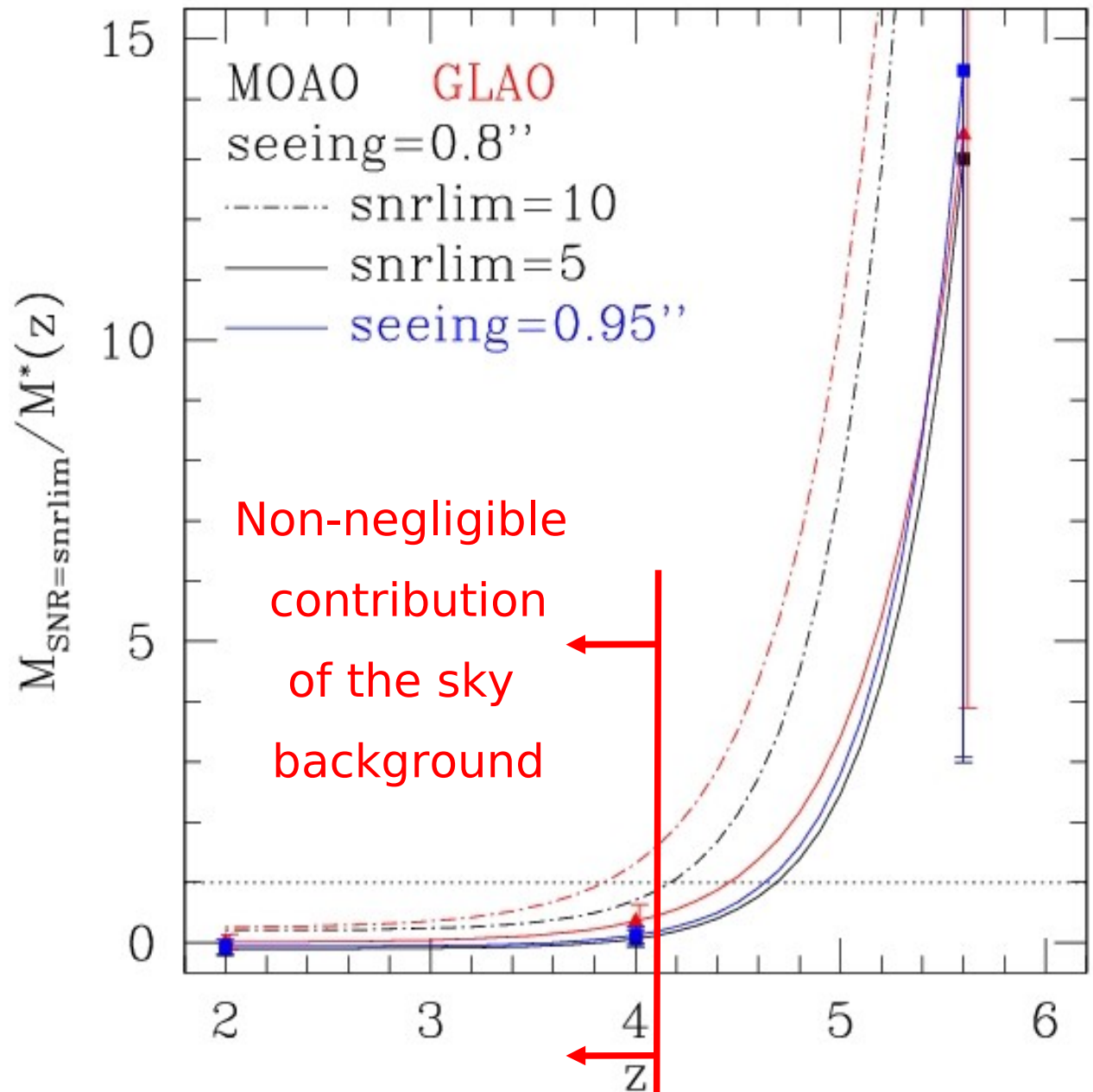
K-band z=5.6

Telescope ~ 90 % of total thermal background

Influence of site background

In a background-limited regime:

SNR α 1/√(background)

Paranal sky background model = 2 x Mauna Kea sky background model in H-band

SNR=5 at "Paranal" would correspond to SNR=7 at "Mauna Kea", everything else being equal

MOAO   GLAO
seeing=0.8''
-·-·- snrlim=10
——— snrlim=5
——— seeing=0.95''

Non-negligible contribution of the sky background

$M_{SNR=snrlim}/M^*(z)$

Influence of Background Summary

- Impact of telescope:

    • In simulations: "optimistic" case with T=280K and ε=5% (could be 15% depending on coating)

    • Dominant source of background in K-band for the z=5.6 case & SNR in background-limited regime : limits detectability a very high z.

- Impact of site:

    • In simulations: "optimistic" case with Mauna Kea model. Paranal model is 2 times brighter in H band.

    • Sky background: dominant source of background for z<5. In this case, the scaling relation SNR α 1/√(background) can be used to assess the influence of sky background at first order.

DRM report

Report completed :

The E-ELT Design Reference Mission:
The physics and mass assembly of galaxies out to z~6
Results of Simulations

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