

Extended inverse-Compton emission from distant, powerful radio galaxies

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Outline:

What is inverse-Compton emission?

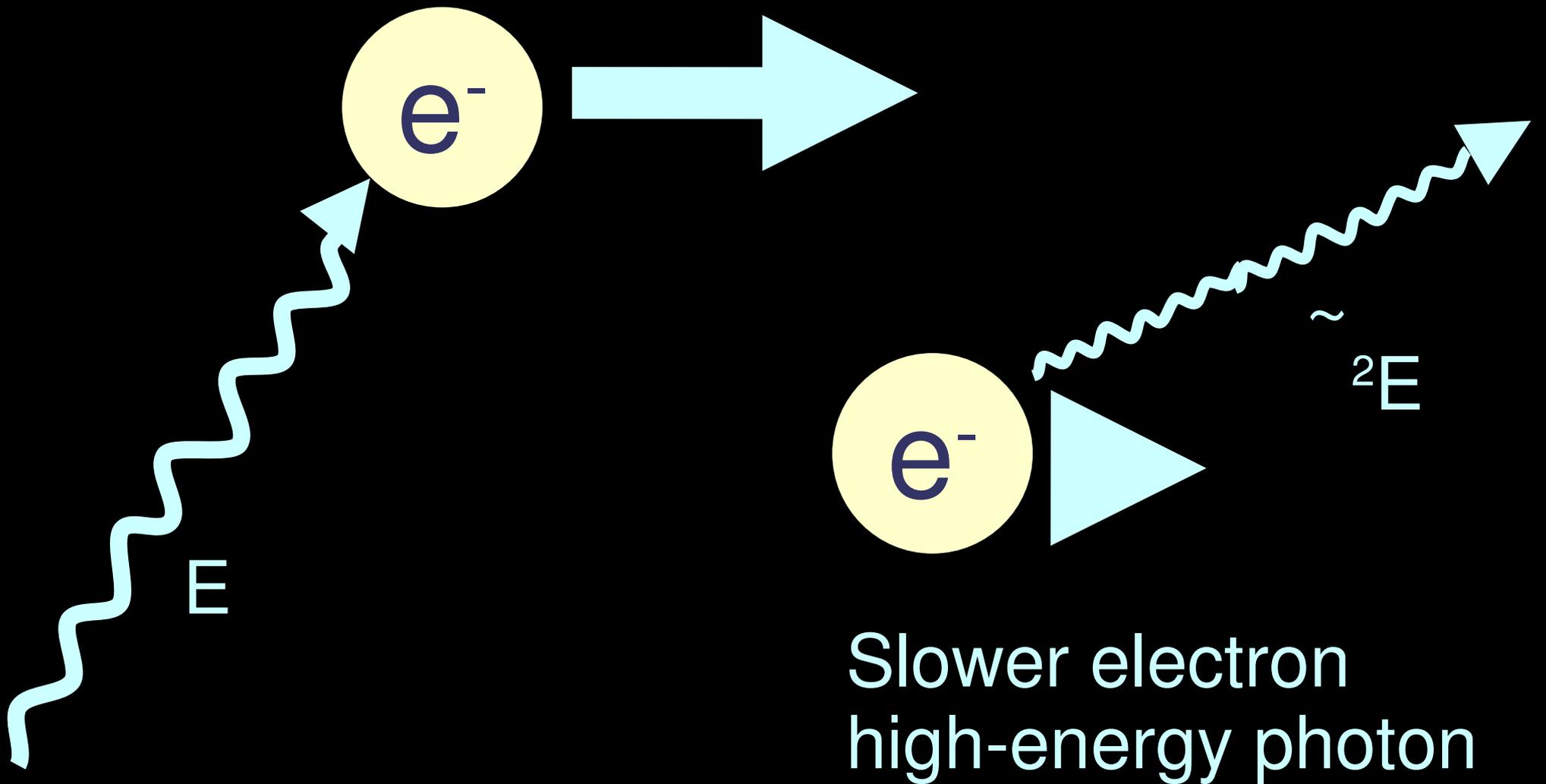
Where are we looking for it?

Why do we think that we detect it?

What does this tell us about the jets/lobes?

What is inverse-Compton emission?

Relativistic electron
low-energy photon



Inverse-Compton scattering of the CMB (ICCMB)

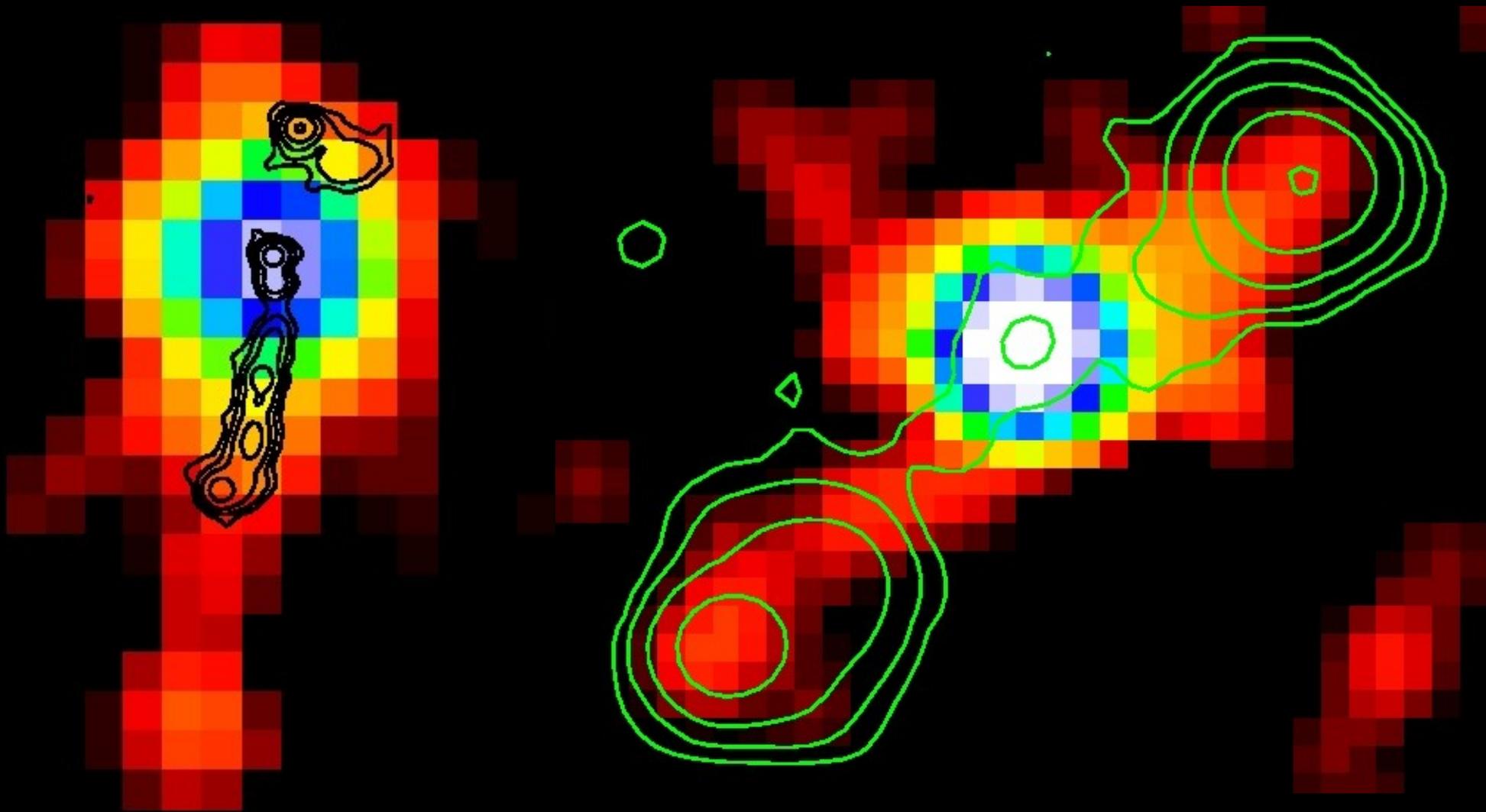
CMB energy density goes as $(1+z)^4$ so counterbalances surface brightness dimming with redshift

Electrons typically less relativistic than for synchrotron emission

Electrons typically cool slower than for synchrotron emission so emission from older plasma

Where are we looking
for ICCMB?

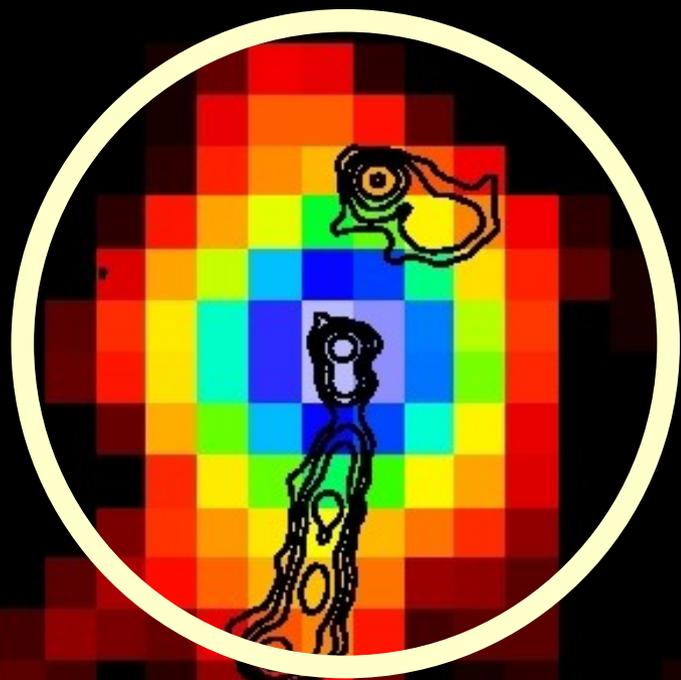
Z \sim 2 radio loud QSOs



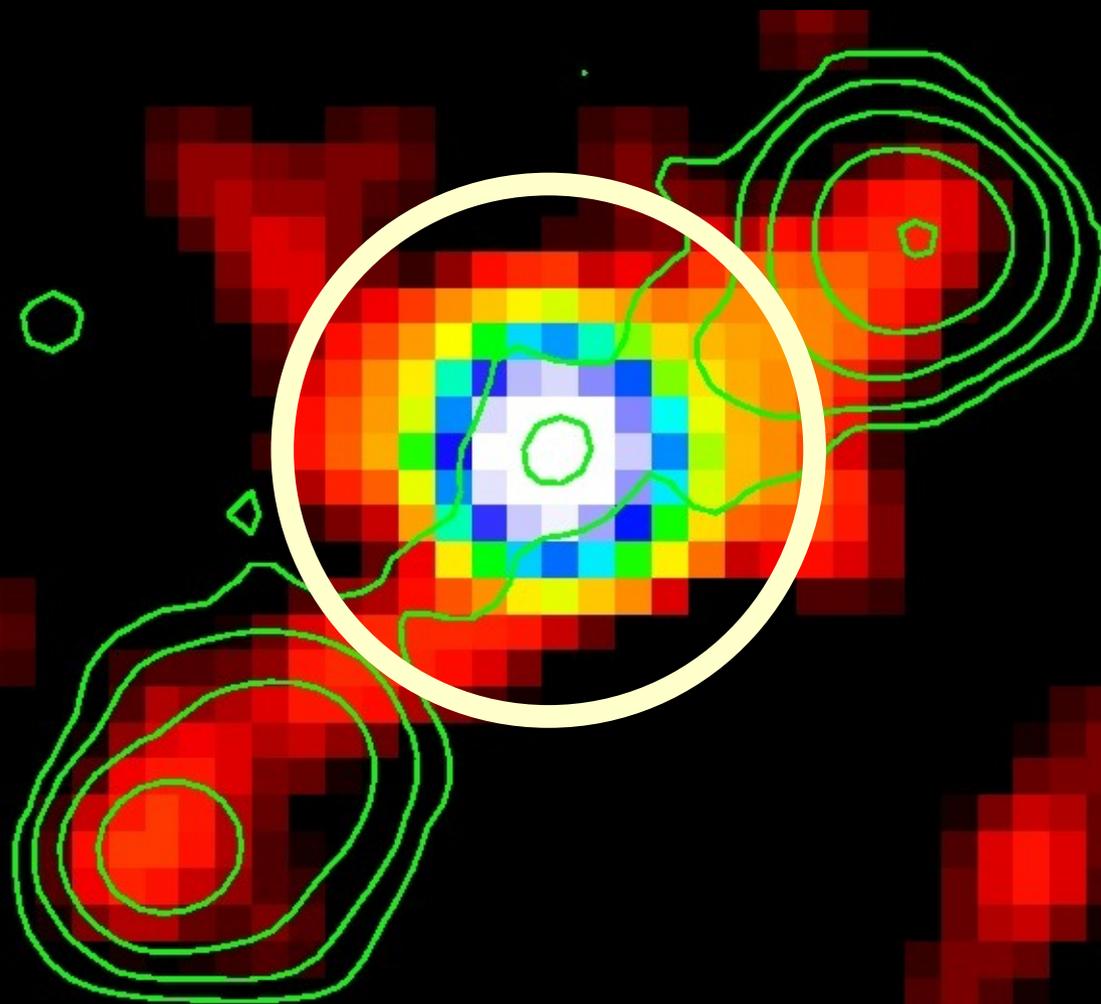
3C191, $z=1.956$

3C432, $z=1.785$

Why do we think that we
detect ICCMB?



3C191



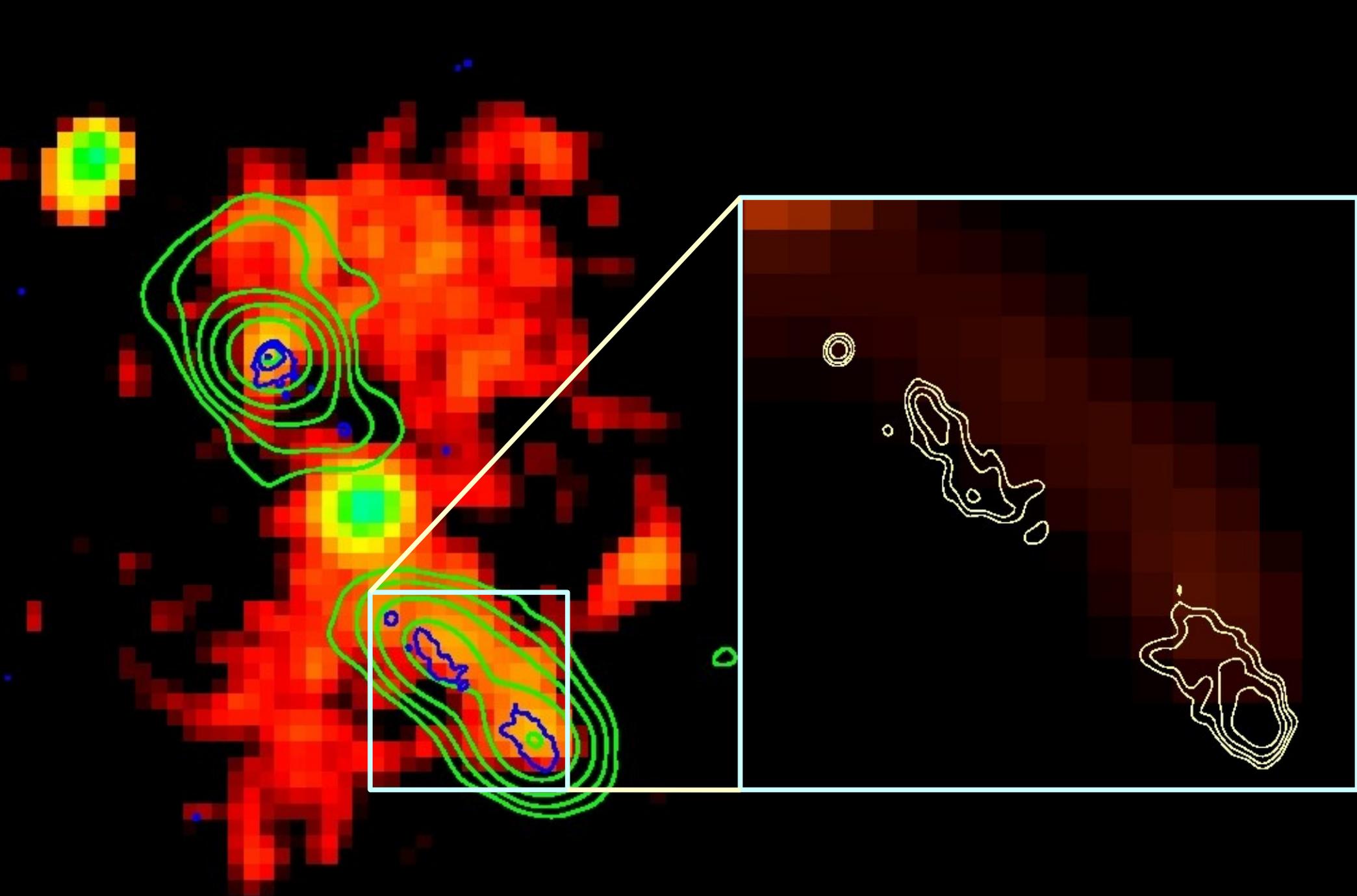
3C432

What does this tell us
about the jets-lobes?

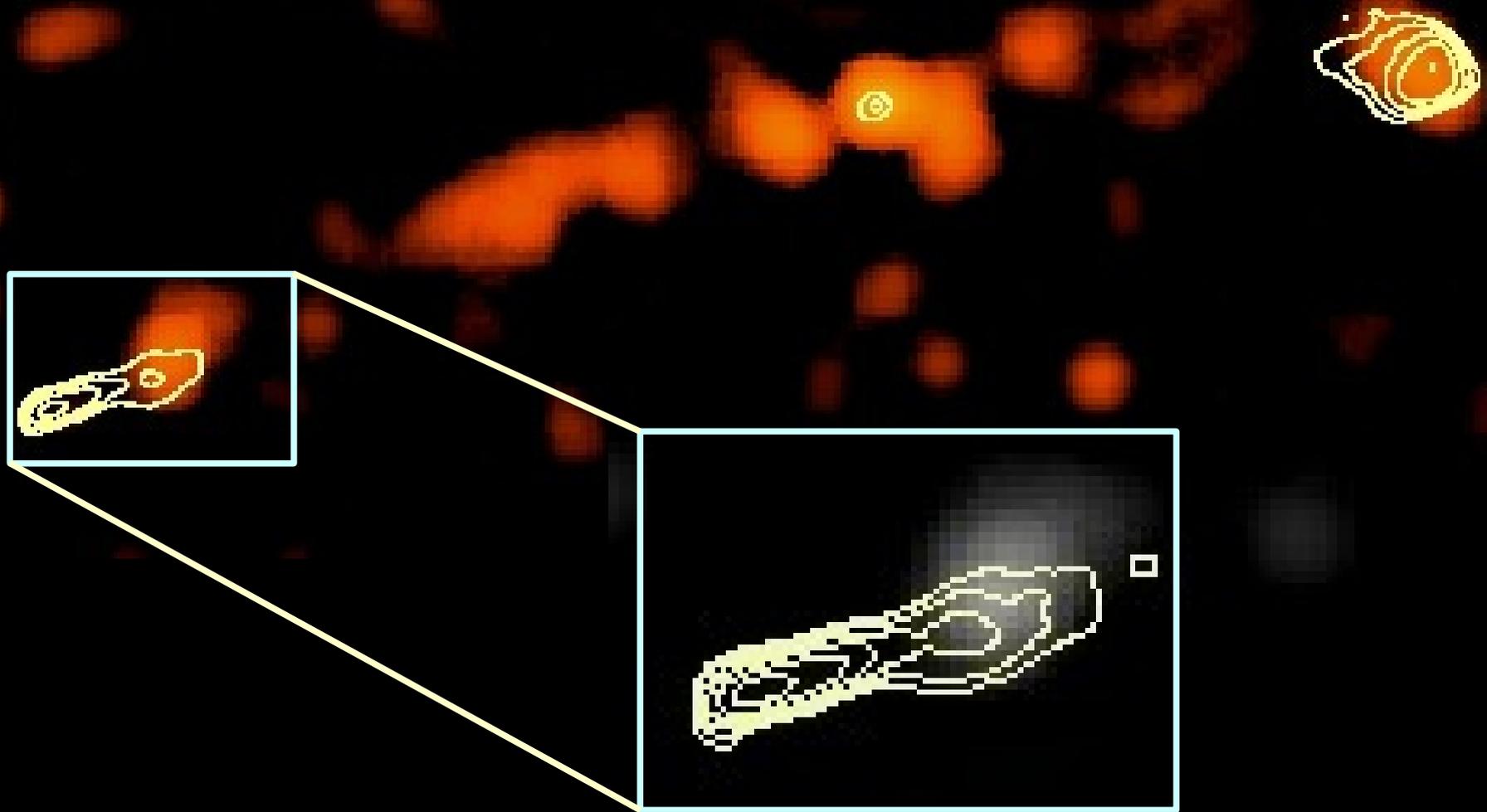
A lower limit to the energy stored in the jet/lobe in relativistic particles responsible for up-scattering CMB photons into the X-ray

For these $z \sim 2$ galaxies $E \sim 10^{59}$ erg

ICCMB extended emission
in other $z \sim 2$ radio galaxies



3C 294, $z=1.799$



6C 0905+3955, $z=1.88$

Conclusions:

Extended X-ray emission is detected from powerful (relatively) high redshift jets/lobes

This is probably from ICCMB because of the extended nature of the X-ray emission

If we assume that this is due to ICCMB, we can get a lower limit on the energy stored in relativistic electrons in the jet/lobe