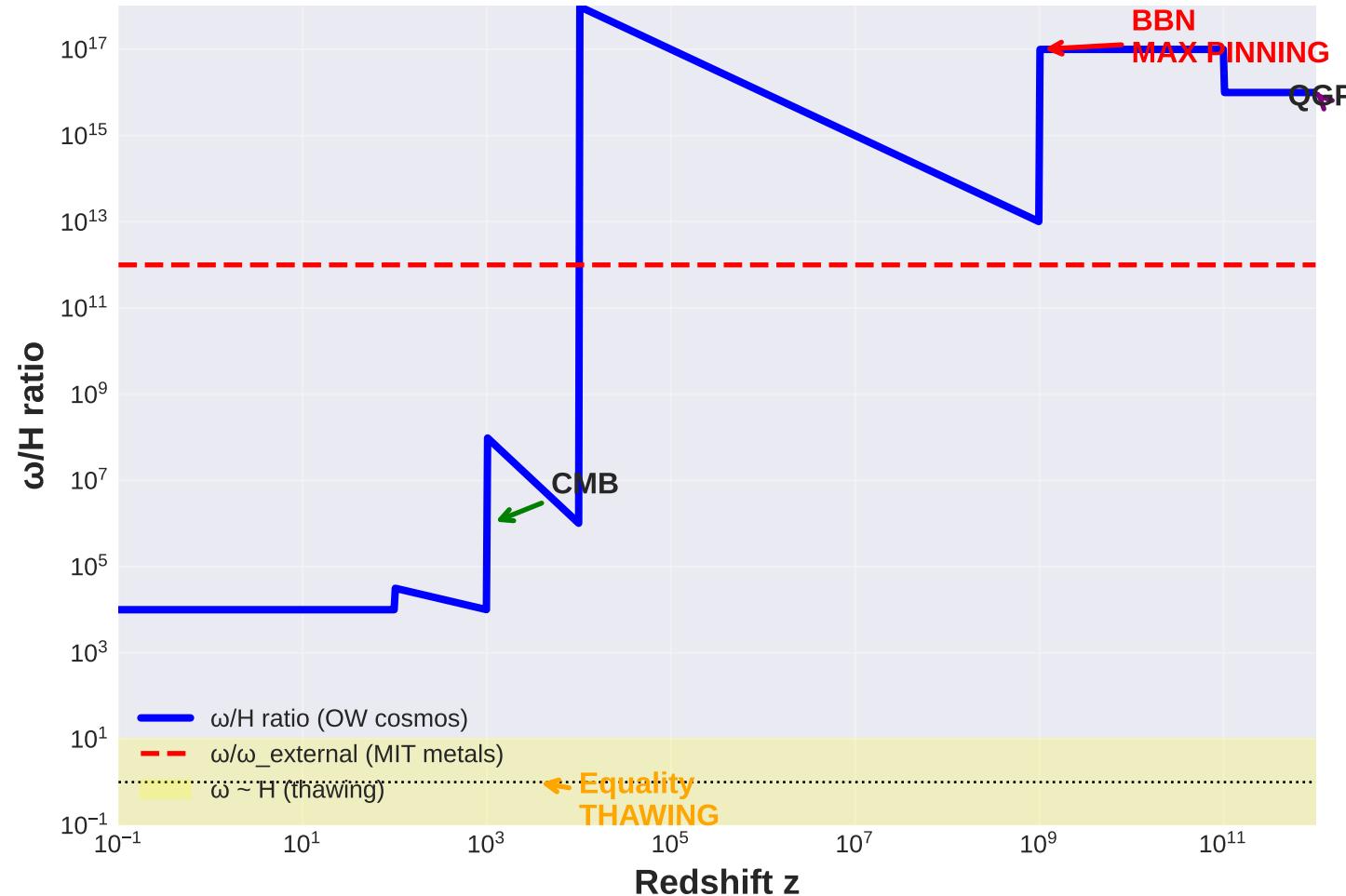
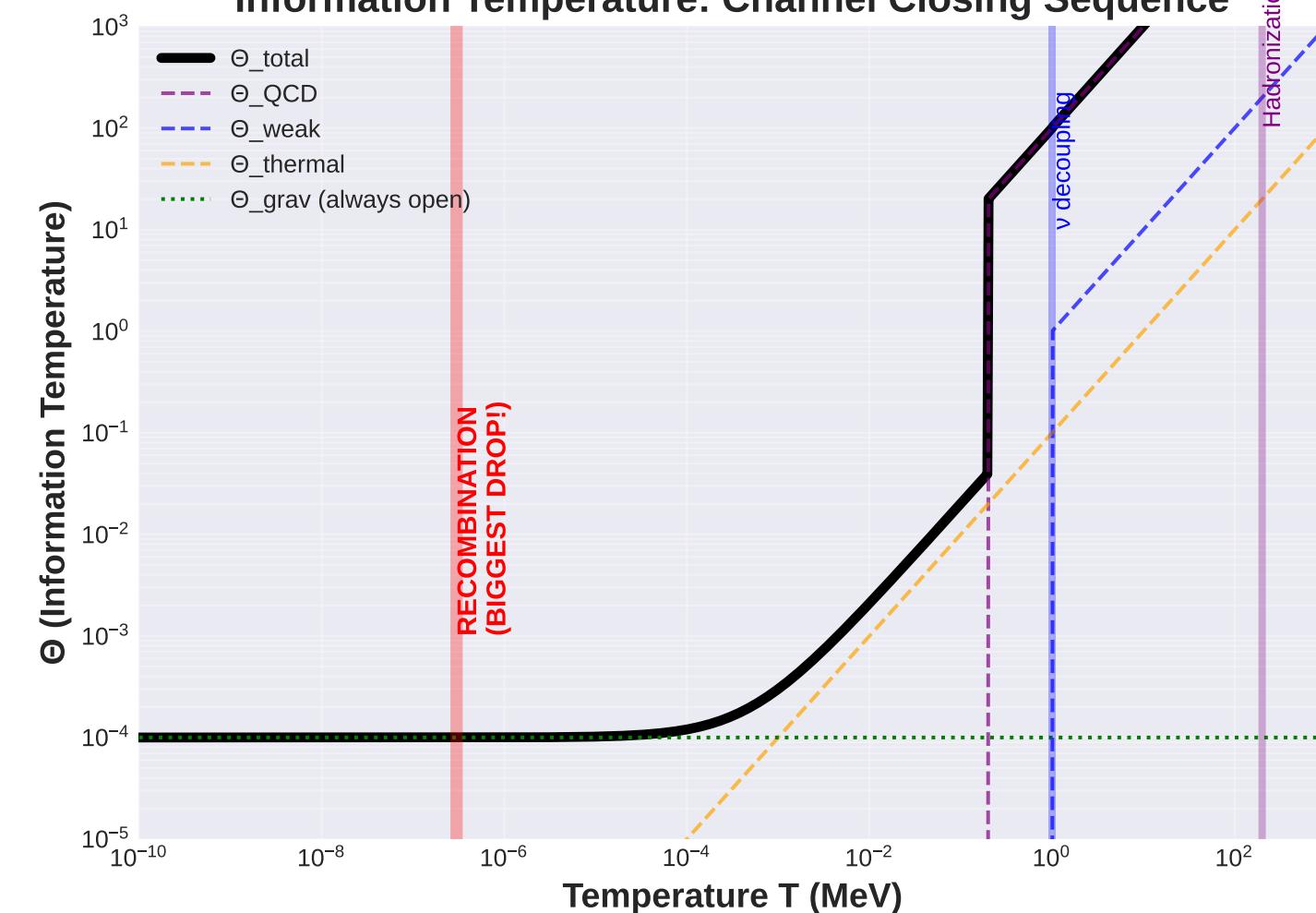


Thermal Pinning Strength Through Cosmic History



Information Temperature: Channel Closing Sequence



Thermal Pinning: MIT \leftrightarrow OW Quantitative Comparison

Property	MIT (Metals)	OW (Cosmos)
Field	Atomic positions	Scalar field σ
Temperature	300-1000 K	10^{12} K (BBN)
m_{eff}^2	$2 \text{ eV}/\text{\AA}^2$	$(10^{13} \text{ MeV})^2$
ω_{internal}	10^{13} Hz	10^{34} Hz
ω_{external}	10^1 Hz	10^{17} Hz
$\omega/\omega_{\text{ext}}$	10^{12}	10^{17}
Mechanism	Far-from-eq	Thermal pinning
Result	SRO patterns	Structure frozen

Energy Budget at Recombination: Where Does Channel Energy Go?

