A search on the internet renders a whole load of bunkum, bullshit, bollocks (I apologise) regarding any fundamental maximum temperature.

https://futurism.com/science-explained-hottest-possible-temperature

How do we take energy up to infinity? Theoretically, it is possible.

Can anyone deduce that from ascertained physical truths?

the highest possible known temperature is 142 nonillion kelvins (10^{32} K.).

Yeah? Do we really know that? How? Has it been observed?

No heat exchange. No temperature.

Which lucid mind invented that?

https://www.quora.com/Thermodynamics-Is-there-a-maximum-temperature

We know that there can't be anything smaller than planck's length (...)

Yeah? Do we really know that? How? Has it been observed?

BTW: Max Planck was a human being, so please capitalise his name. And it is the Planck length, not Planck's length. The latter would be about 1.75 metres.

The simple answer to the question is: we just don't know.

Temperature actually is an emerging quantity proportional to the mean kinetic energy per molecule. To be clear: this is the kinetic energy of the stochastic intermolecular motion resulting from collisions, not the motion of their barycentre, i.e. motion of the cloud or body as a whole.

Very often the Planck temperature: $T_\mathrm{P} = \sqrt{hc^5/2\pi G k_\mathrm{B}^2} \approx 1.417 \times 10^{32}$ K
is said to be the hottest possible.
It would cause thermal radiation with a wavelength equal to the Planck length: $l_\mathrm{P} = \sqrt{hG/2\pi c^3} \approx 1.616 \times 10^{-35}$ m.
I consider this a ridiculously high temperature. I have a substitute for it[1], which is not a maximum but a sort of temperature quantum.

Then there is the Hagedorn temperature[2]: $T_\mathrm{H} \triangleq 158$ Mev $\triangleq \sim 1.22 \times 10^{12}$ K.
It is often said this is not to be seen as a fundamental maximum, but as a sort of melting point or so. I insist however that it *is* sort of a fundamental maximum. It roughly equals the temperature of pions (the lightest hadrons) having a kinetic energy equal to their rest energy $E = mc^2$.

We can say that: $$T_\mathrm{rest}(m) = \frac{2mc^2}{3k_\mathrm{B}}$$

is a temperature tipping point. Above it, pair production becomes more and more abundant when it gets hotter. It would mean that adding more energy does not increase the mean kinetic energy per molecule, but it just adds more molecules. This would imply the temperature cannot significantly exceed say twice this tipping point temperature. It would not be a sharp upper limit, but a vague swampy boundary. *In Dutch: een drassig moeras waarin gij g'leidelijk verzande...*

It would equal: $T_\mathrm{blop}(m) = 4mc^2/3k_\mathrm{B}$ (*blop* = blurry top).

electron:	$T_\mathrm{rest}(e) \approx 3.95$ GK,	$T_\mathrm{blop}(e) \approx 8$ GK,
proton:	$T_\mathrm{rest}(p) \approx 7.26$ TK,	$T_\mathrm{blop}(p) \approx 15$ TK.

[1] see http://henk-reints.nl/astro/HR-Geometry-of-universe-slideshow.pdf (search: "Planck units superfluous")
[2] see https://cerncourier.com/a/the-tale-of-the-hagedorn-temperature/

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