

Response to Referee C

Referee C agrees that *"no hint has been given as to what physics may be missing and I find that the author's response to this criticism makes sense"*. However he/she suggests that *"the analysis can and should be taken one step further"*. In particular, that there is entropy production due to *"a $(\text{grad } T)^2$ term due to the heat flow"*, and that *"A more careful study should therefore combine a time- and position-dependent temperature field $T(t,r)$ "*.

Let me explain why that is not necessary. It is because there are several independent variables in the problem, that are at our disposal. In particular: κ , the thermal conductivity of the wall between system and reservoir that determines the speed of the process, σ_n , the normal state conductivity, κ_{sys} , the thermal conductivity of the system. Also whether we heat the system from the outside in or from the inside out is at our disposal (cf discussion in 5th paragraph of Sect. VI).

So the referee suggests that *"it could happen that small changes of the $(\text{grad } T)^2$ contribution (caused by superconductivity) compensate the Joule heat term."* Well I can consider the same process in a system where everything is the same except κ_{sys} is much larger, therefore $(\text{grad } T)^2$ contribution would be much smaller because the temperature equilibrates faster, but it would have to compensate the same amount of Joule heat. Or, I can consider the same process where everything is the same except σ_n is twice as large and κ is smaller by an amount such that the rate of the process is twice as slow. Then the Joule heat generated stays the same, but because the process is slower the contributions of $(\text{grad } T)^2$ terms will be smaller so they can't compensate the same Joule heat. Etc.

For that reason, I argue that it is clear that the more detailed study suggested by the referee with a $T(t,r)$ would add absolutely nothing to the paper. If it would be publishable with those details added, it should be equally publishable without.