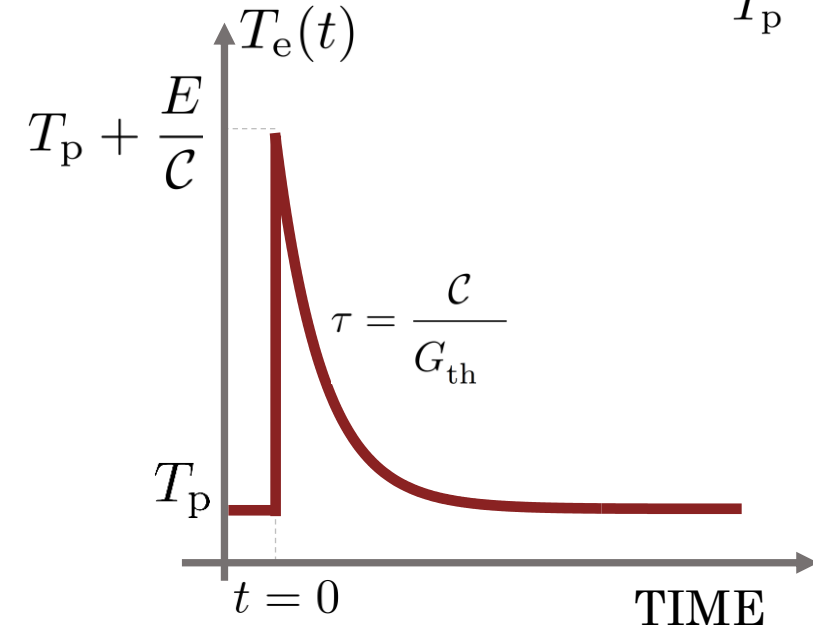
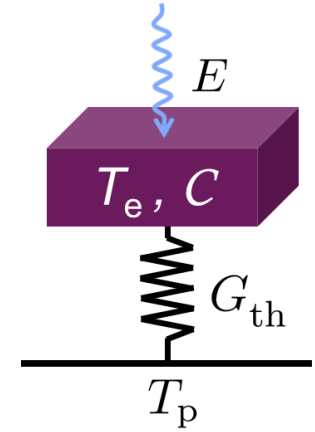
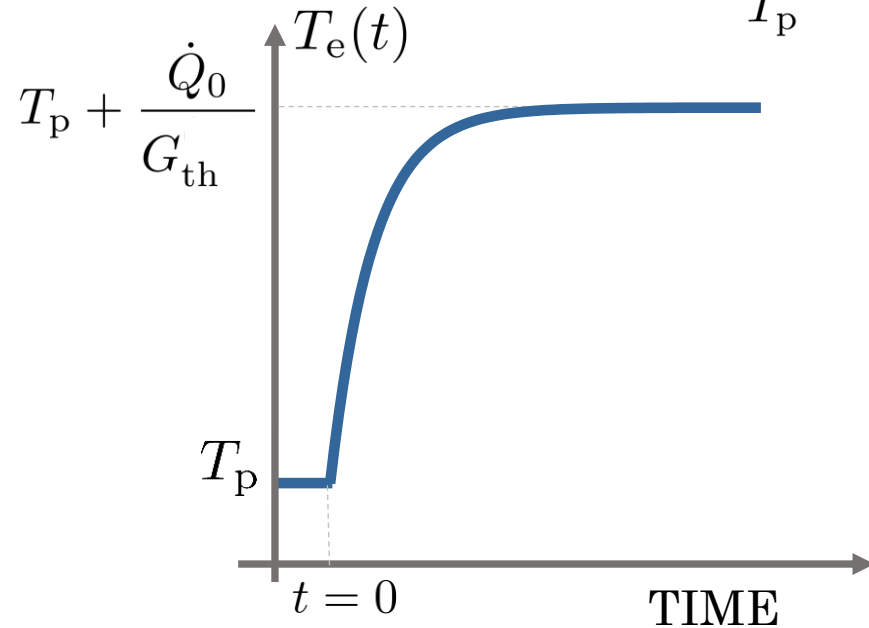
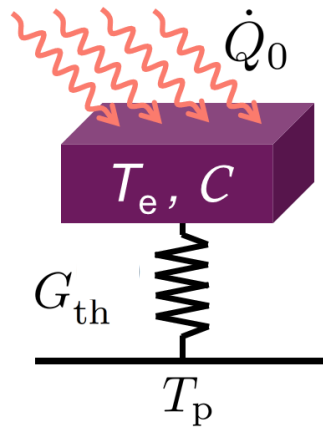
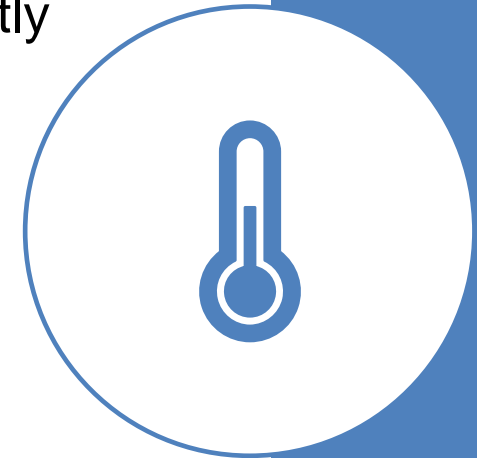


# Bolometer versus calorimeter



# Low-temperature thermometry

- The thermometer should have a wide operating temperature range and should be insensitive to environmental changes, such as magnetic fields.
- The property  $x$  to be measured must be easily, quickly, and exactly accessible to an experiment.
- The temperature dependence of the measured property,  $x(T)$  should be expressible by a reasonably simple law
- The sensitivity  $(\Delta x/x)/(\Delta T/T)$  should be high
- The thermometer should reach equilibrium in a “short” time, both within itself and with its surroundings whose temperature it is supposed to measure. Therefore it should have a small heat capacity, good thermal conductivity and good thermal contact to its surroundings. In particular, the thermal contact problem is ever present for thermometry at  $T \leq 1$  K.
- The relevant measurement should introduce a minimum of heat to avoid heating of the surroundings of the thermometer and of course, above all, heating of itself; this becomes more important the lower the temperature.



Frank Pobell,  
Matter and  
methods at low  
temperatures,  
Third Edition,  
Springer, 2007.